A4

Rev.	Data	Descrizione
P01	30/06/2026	Integrazioni Mase

Comune di
Zibido San Giacomo

Progettazione masterplan, Progettazione architettonica,
Progettazione ingegneristica

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Committente

Amazon Data Services Italy S.r.l.

Progetto

PERMESSO DI COSTRUIRE
art. 10(L), D.P.R. 6 Giugno 2001, n° 380

Progetto di Data Center
in Via G. Verdi n° 9, Zibido San Giacomo,
Milano, Italia

Signed with NamirialSign
MATTEO BRUNO
01/07/2026 12:40:43 UTC+0200

Fase progettuale:

Permesso di Costruire

Titolo Elaborato

Report Illuminotecnico

Scala
N/A

Disciplina	By / Chkd / Appd
Elettrico	SC/VM/FP

Arup Job No	Rev
306134-00	P01

Tav. No
EIA-DLUX-Annex 1

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1. Quadro normativo di riferimento

1.1 Norme di carattere generale

Di seguito sono riportate le principali norme tecniche e pubblicazioni di riferimento utilizzate per la progettazione illuminotecnica e per la valutazione degli aspetti connessi all'inquinamento luminoso.

Norme CEI (Comitato Elettrotecnico Italiano):

- CEI EN IEC 60598-1 - Apparecchi di illuminazione - Parte 1: Prescrizioni generali e prove

- CEI EN 60598-2-3: Apparecchi di illuminazione stradale

- CEI EN 61547: Apparecchiature per illuminazione generale -Prescrizioni di immunità EMC

- CEI 64-8: Impianti elettrici utilizzatori a tensione nominale non superiore a 1000 V in corrente alternata e a 1500 V in corrente continua (2007)

- CEI EN 60529 – Gradi di protezione degli involucri (Codice IP).

Norme UNI (Ente Italiano di Unificazione):

- UNI EN 40: Sostegni per l'illuminazione: dimensioni e tolleranze

- UNI 11248 "Illuminazione stradale - Selezione delle categorie illuminotecniche"

- UNI EN 12464-1: Luce e illuminazione – Illuminazione dei posti di lavoro – Parte 1: Posti di lavoro in interni

- UNI EN 12464-2: Luce e illuminazione - Illuminazione dei posti di lavoro - Parte 2: Posti di lavoro in esterno

- UNI EN 13201-1: Illuminazione stradale - Parte 1: Selezione delle categorie illuminotecniche

- UNI EN 13201-2: Illuminazione stradale - Parte 2: Requisiti prestazionali

- UNI EN 13201-3: Illuminazione stradale - Parte 3: Calcolo delle prestazioni

- UNI EN 13201-4: Illuminazione stradale - Parte 4: Metodi di misurazione delle prestazioni fotometriche

- UNI 10819: Impianti di illuminazione esterna - Requisiti per la limitazione della dispersione verso l'alto del flusso luminoso

Norme CIE (Commissione Internazionale per l'Illuminazione):

- CIE 17.4 – International Lighting Vocabulary
- CIE 68 – Guide to the Lighting of Exterior Working Areas
- CIE 115 – Recommendations for the Lighting of Roads for Motor and Pedestrian Traffic
- CIE 121 – The Photometry and Goniophotometry of Luminaires
- CIE 126 – Guidelines for Minimizing Sky Glow

1.2 Normativa regionale in materia

Con Legge Regionale 5 ottobre 2015, n. 31, pubblicata sul BURL n° 41 suppl. del 09 Ottobre 2015, sono state approvate le nuove "Misure di efficientamento dei sistemi di illuminazione esterna con finalità di risparmio energetico e di riduzione dell'inquinamento luminoso".

La legge 31/2015, abrogativa della precedente l.r. 27 marzo 2000, n. 17, persegue l'efficientamento degli impianti di illuminazione esterna attraverso l'impiego di sorgenti luminose a ridotto consumo e a elevate prestazioni illuminotecniche e il risparmio energetico mediante il contenimento dell'illuminazione artificiale.

Il progetto oggetto della presente relazione è stato sviluppato adottando apparecchi con emissione controllata verso l'alto e nel rispetto dei principi di contenimento della dispersione luminosa previsti dalla normativa regionale vigente.

2. Descrizione generale del Progetto

La configurazione finale dello sviluppo del data centre è illustrata nel masterplan riportato di seguito, che definisce la disposizione generale e l'organizzazione spaziale del sito.

Lo sviluppo è caratterizzato dalla presenza di un edificio principale di grandi dimensioni, posizionato centralmente e destinato ad ospitare le principali funzioni del data centre, attorno al quale il sito è organizzato mediante un sistema chiaro e strutturato di viabilità interna e zone infrastrutturali.

Il masterplan definisce una disposizione ordinata dei volumi costruiti, delle aree tecniche e dei percorsi di accesso, garantendo un'efficiente connessione tra tutte le componenti funzionali dell'intervento.

L'edificio comprende data hall, locali elettrici e aree di distribuzione tecnica organizzate secondo una configurazione modulare, al fine di supportare un funzionamento efficiente e scalabile. Gli spazi di servizio sono integrati all'interno della struttura principale, mentre un edificio dedicato al trattamento delle acque (Water Treatment Building – WTB) è collocato all'interno del sito a supporto della rete infrastrutturale complessiva.

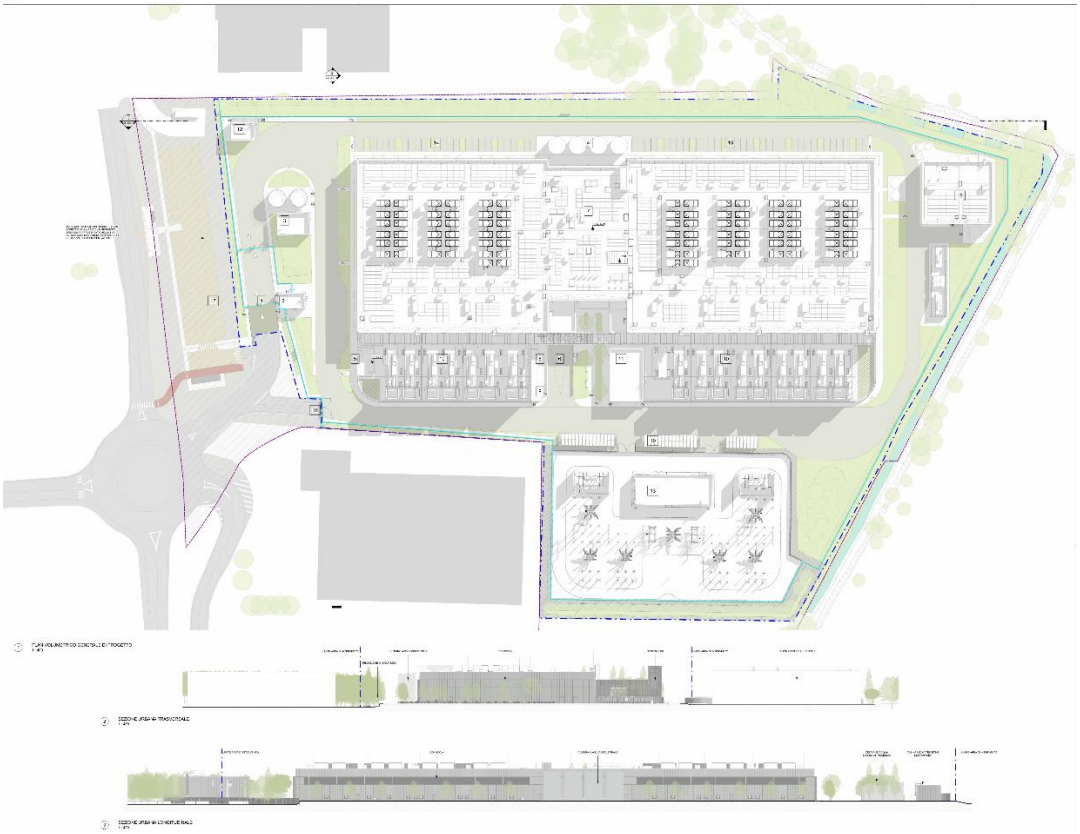


Figura 1: Masterplan di Progetto

L'assetto planimetrico del sito prevede una viabilità interna ad anello che consente una circolazione veicolare controllata, con accesso principale situato sul lato ovest e collegato alla rete stradale circostante. Le aree tecniche esterne sono disposte lungo il perimetro e comprendono zone recintate dedicate ai generatori di emergenza e alle relative apparecchiature, garantendo elevati livelli di resilienza operativa.

Ulteriori superfici sono destinate a funzioni logistiche, parcheggi e attività di supporto, nonché a zone a verde lungo il perimetro, che contribuiscono all'organizzazione e all'integrazione del sito nel contesto circostante.

Il Data Center prevede, a regime, n. 17 generatori di emergenza, di cui 16 generatori da 2,8 MWe e 1 generatore da 0,8 MWe.

3. Fase di esercizio

L'illuminazione esterna operativa e di sicurezza prevede:

- L'illuminazione di strade/piazzali e recinzioni
- L'illuminazione sotto le pensiline dei parcheggi
- L'illuminazione in copertura
- L'illuminazione della facciata dell'edificio e dell'area generatori

- L'illuminazione di accesso al data centre
- L'illuminazione esterna degli edifici ausiliari a supporto del data centre (Edificio trattamento acque)

3.1.1 Illuminazione esterna recinzione e strade

Di seguito vengono rappresentate le curve isometriche relative ai livelli di illuminazione delle aree esterne

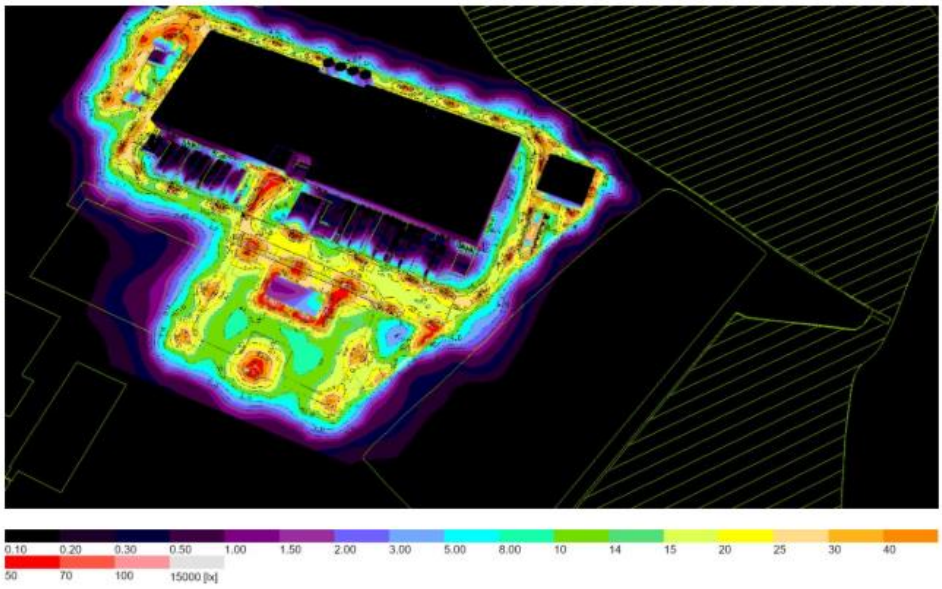


Figura 2: Curve di isolivello dell'illuminamento delle aree esterne

Per gli spazi esterni (strade/piazzali e recinzioni) saranno utilizzate cinque tipologie di corpi illuminanti come da specifica a seguire:

pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy	Index
15	Thorlux Lighting	RL18A27	Realta - 18W - Area Distribution - 2700K	20.0 W	2860 lm	143.0 lm/W	X7/E
7	Thorlux Lighting	AS32_LED_45W_GR5_BS_3000K_FG	AS32_LED_45W_GR5_BS_3000K_FG	45.0 W	5117 lm	113.7 lm/W	X1BS
39	Thorlux Lighting	AS48_LED_75W_GR5_3000K_FG	AS48_LED_75W_GR5_3000K_FG	75.0 W	10484 lm	139.8 lm/W	X2
14	Thorlux Lighting	AS96_LED_155W_GA2_3000K_FG	AS96_LED_155W_GA2_3000K_FG	155.0 W	21481 lm	138.6 lm/W	X3
8	Thorlux Lighting	N/A	A32_GEN2_LED_43W_GR5_(Blue)_G0_IBS_3000K_FG	43.0 W	4746 lm	110.4 lm/W	X1IS
43	Thorlux Lighting	RL07W3	Realta 7W Wide Area Lens	9.0 W	1085 lm	120.6 lm/W	X5/E

Figura 3:Elenco degli apparecchi di illuminazione utilizzati per le aree esterne del progetto

- X1BS (X1 con schermo posteriore esterno): utilizzata per l'illuminazione della viabilità veicolare interna al sito
- X1IS (X1 con schermo posteriore interno): adottata nei casi in cui sia richiesto un maggiore controllo della luce retro-emessa, al fine di limitare la dispersione luminosa nelle aree circostanti
- X2: destinata all'illuminazione della recinzione di sicurezza lungo l'intero perimetro di Progetto
- X3: impiegata per l'illuminazione delle aree principali e delle zone di accesso al sito
- X5/E e X7/E: utilizzate principalmente per l'illuminazione delle facciate degli edifici ausiliari

Tutti i corpi illuminanti utilizzati (32, 48 e 96 LED) sono certificati come "dark-sky friently product" dalla International Dark Sky Association.

L'International Dark Sky Association collabora con i produttori per valutare e certificare l'illuminazione esterna che riduce l'inquinamento luminoso. Questo obiettivo viene raggiunto seguendo i criteri indicati di seguito:

- Utilità: utilizzare solo luci utili che abbiano un accreditamento di sicurezza da parte di terzi e file fotometrici che convalidino le prestazioni della lanterna.
- Direzione della luce: ridurre la dispersione luminosa fornendo opzioni di schermatura e limitando la luce verso l'alto. La tolleranza per la luce verso l'alto dell'apparecchio è pari allo 0,5% della potenza totale o a 50 lumen (il valore più basso), con meno di 10 lumen nella zona di illuminazione verso l'alto da 90° a 100°. Le lanterne devono avere un montaggio fisso (con inclinazione massima di +/-10°).
- Basso livello: non deve essere presente più luce del necessario.
- Controllo: offrire opzioni di controllo e dimmerazione per garantire la regolazione dei livelli di luce in base alle esigenze. Gli apparecchi devono avere una capacità di dimmerazione pari al 10% della potenza nominale.
- Temperatura di colore calda: gli apparecchi approvati devono avere una CCT di 3000K o inferiore per limitare la quantità di luce blu emessa.

A seguire un'immagine tipo degli apparecchi utilizzati. Nell'allegato A sono inserite le specifiche tecniche degli apparecchi luminosi precedentemente citati.

Figura 4:Immagine tipo corpo illuminante utilizzato per le aree esterne di progetto

3.1.2 Illuminazione pensiline parcheggi

Sotto le pensiline fotovoltaiche sono previsti apparecchi di illuminazione finalizzati a garantire adeguati livelli illuminotecnici nelle aree di parcheggio.

Le pensiline sono installate esclusivamente in specifiche porzioni del sito, in particolare nell'area di sosta adiacente alla sottostazione elettrica. La copertura è costituita da moduli fotovoltaici caratterizzati da una superficie a bassa riflettanza; pertanto, il loro contributo alla riflessione della luce artificiale può essere considerato trascurabile ai fini della presente valutazione illuminotecnica.

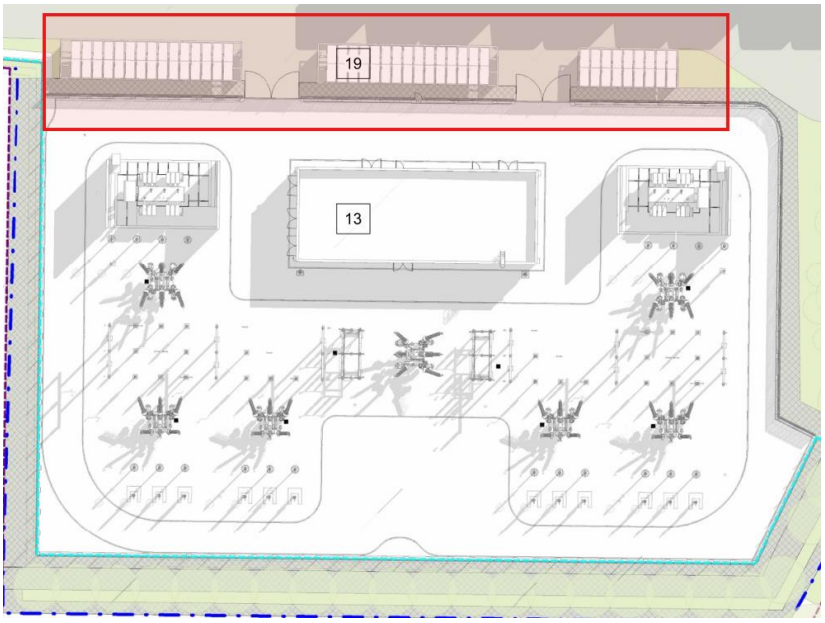


Figura 5:Localizzazione delle pensiline fotovoltaiche installate

Di seguito è riportata la tipologia di corpo illuminante di riferimento.

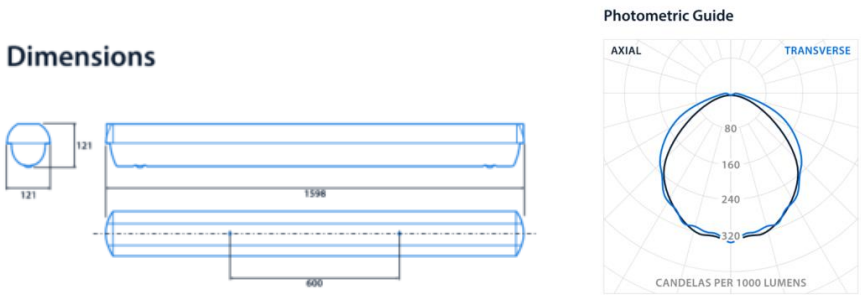


Figura 6:Immagine tipo corpo illuminante utilizzato per le pensiline fotovoltaiche dei parcheggi

3.1.3 Illuminazione in copertura

La copertura dell'edificio presenta una serie di corpi illuminanti progettati per garantire il livello di illuminazione minimo per la sicurezza dei lavoratori e delle persone presenti nell'edificio. Gli apparecchi illuminanti sono stati quindi previsti in concomitanza dei vani scale per accesso alla copertura e di tutti i camminamenti.

I corpi illuminanti considerati, della tipologia con dispersione verso l'alto pari allo 0%, sono i seguenti:

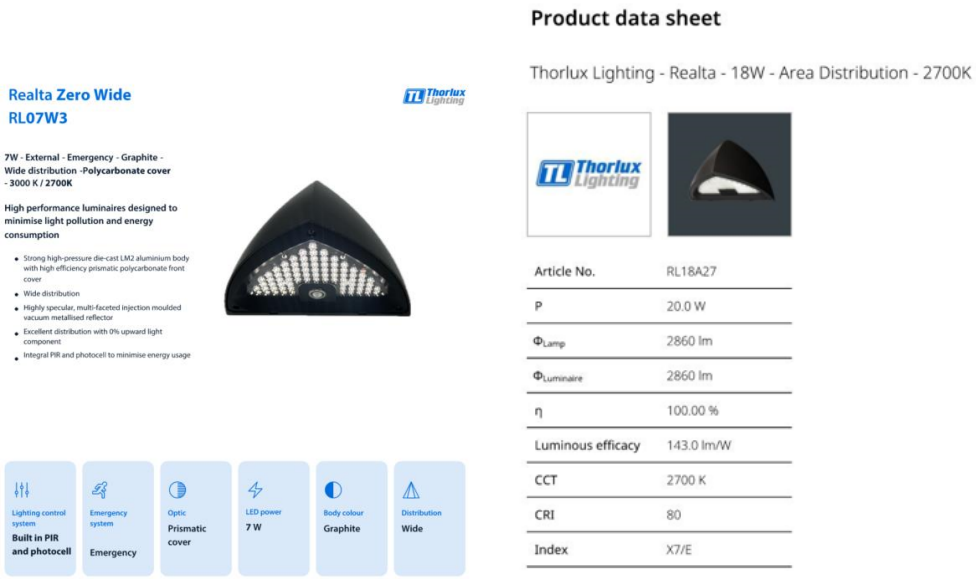


Figura 7: Immagine tipo corpo illuminante utilizzato per la copertura

3.1.4 Illuminazione della facciata dell'edificio dell'area generatori

La facciata dell'edificio e l'area generatori presentano un'illuminazione di base con corpi illuminanti della categoria con dispersione luminosa verso l'alto pari allo 0% della stessa tipologia degli apparecchi della copertura (Realta Zero Wide RL07W3 e RL18A27 a seconda della potenza necessaria – vedere figura 7). Di seguito viene illustrato uno stralcio con relative curve isometriche come riferimento per i livelli di illuminamento.

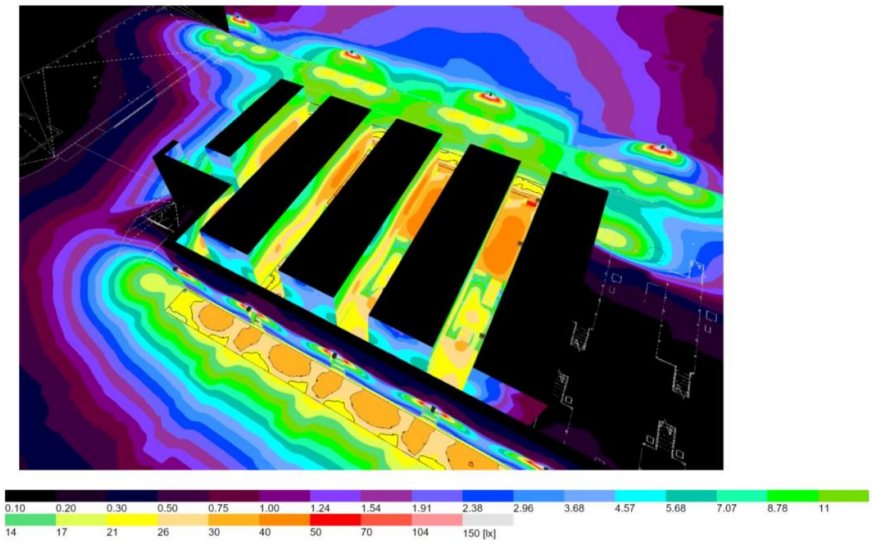


Figura 8:Illuminazione tipo area generatori e facciata

3.1.5 Illuminazione di accesso al data centre

L'accesso al Data Centre è dotato di apparecchi di illuminazione finalizzati a garantire adeguati livelli illuminotecnici nelle aree di ingresso e di transito, in conformità ai requisiti di progetto.

In particolare, l'impianto è costituito da apparecchi illuminanti installati sotto le pensiline dell'edificio e da pali di illuminazione di altezza pari a 3,5 m destinati all'illuminazione delle aree esterne di accesso. Così come tutte le luci esterne del sito, anche queste non generano emissione luminosa al di sopra del piano orizzontale.

Figura 9:Illuminazione area di accesso al data centre

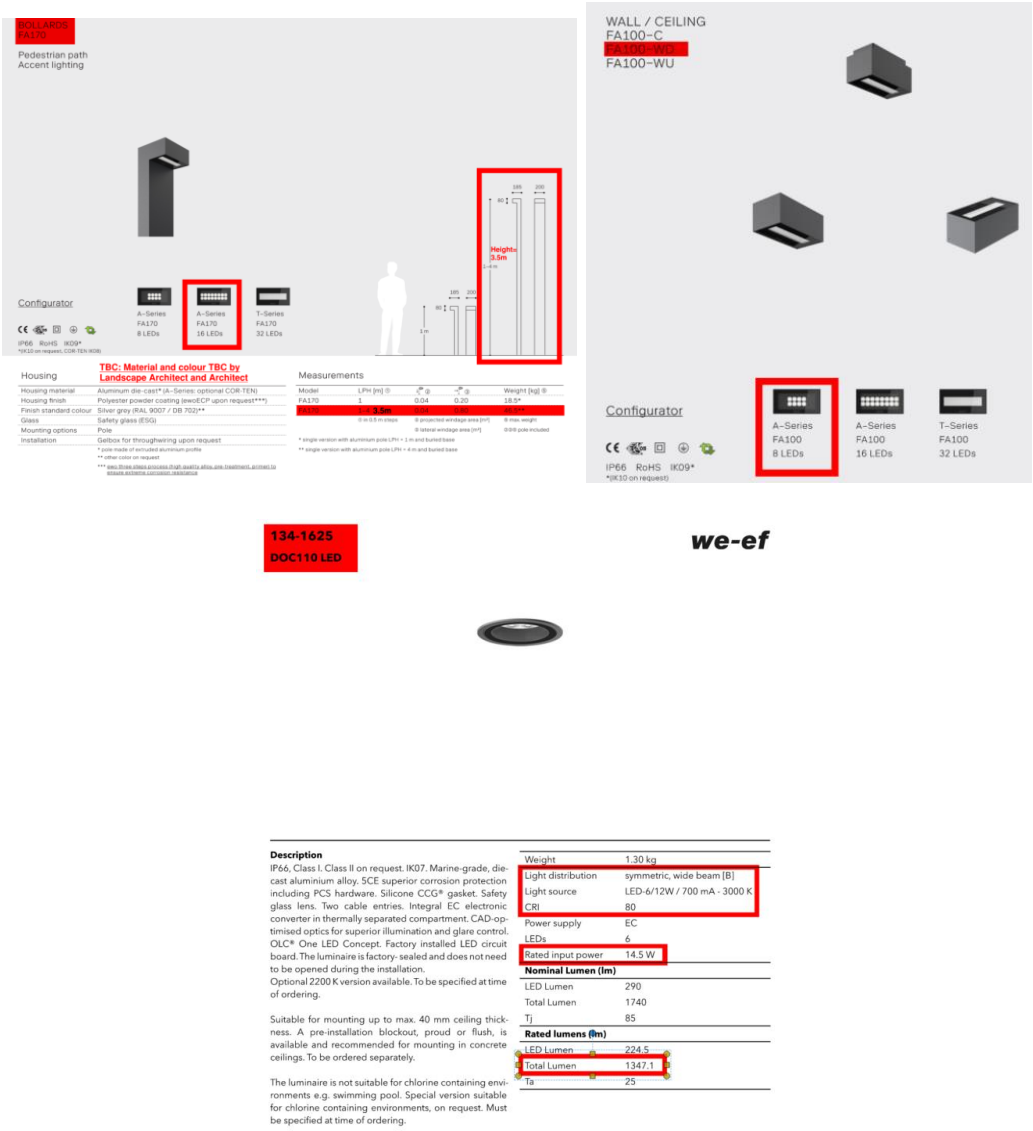


Figura 10:Corpi illuminanti area di accesso al data centre

3.1.6 Illuminazione esterna degli edifici ausiliari a supporto del data centre (Edificio trattamento acque)

L'edificio di trattamento acque prevede illuminazione esterna in facciata, in copertura e nell'area tecnica esterna all'edificio. In tutti i casi viene utilizzata la stessa tipologia di lampada con dispersione luminosa verso l'alto pari allo 0% usata per l'edificio data centre (Realta Zero Wide RL07W3 e RL18A27 a seconda della potenza necessaria – vedere figura 7). Di seguito viene illustrato uno stralcio con relative curve isometriche come riferimento per i livelli di illuminamento.

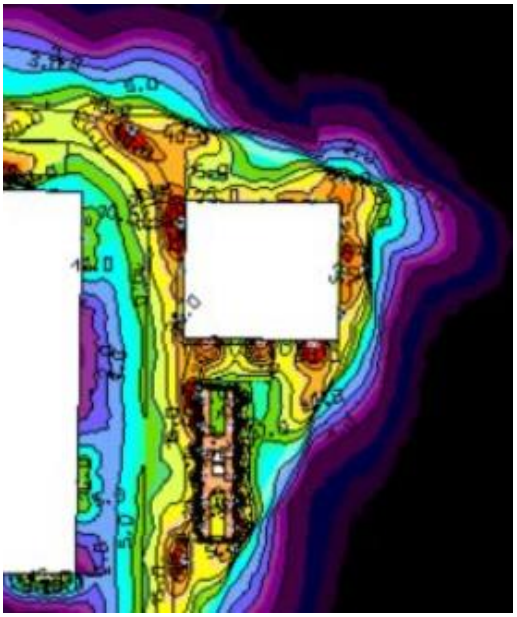


Figura 11:Illuminazione esterna edificio di trattamento acque

3.1.7 Considerazioni relative al fenomeno dell'abbagliamento

Con il termine abbagliamento si indicano due fenomeni transitori della vista che intervengono in maniera completamente diversa sull'occhio umano:

- Abbagliamento energetico che si ha quando l'occhio è sottoposto a una radiazione luminosa come quella prodotta dal Sole e può procurare una temporanea menomazione delle facoltà visive dovuta ad alterazioni della retina;
- Abbagliamento per contrasto, dovuto ad illuminazione artificiale ed è causato dal contrasto tra la radiazione luminosa artificiale e lo sfondo circostante.

In sintesi, ai fini della presente valutazione, per abbagliamento si intende la compromissione temporanea della capacità visiva dell'osservatore a seguito dell'improvvisa esposizione diretta ad un'intensa sorgente luminosa.

In riferimento al tema dell'abbagliamento, si specifica che il progetto non inserisce alcuna intensa sorgente luminosa (es. insegne, cartellonistica) a ridosso delle infrastrutture viabilistiche, ne interviene sull'illuminazione pubblica esistente di pertinenza stradale; pertanto, non si ravvisano particolari criticità a riguardo apportate dal progetto.

3.2 Fase di cantiere

Le attività di cantiere verranno effettuate, per la maggior parte della loro durata, durante le ore diurne/pomeridiane, utilizzando la luce naturale.

Qualora ci fosse bisogno di utilizzare l'illuminazione artificiale:

- Verrà evitata la sovra-illuminazione e verrà minimizzata la luce riflessa verso l'alto utilizzando apparecchi specificatamente progettati;
- Verranno abbassate o spente le luci quando cesserà l'attività lavorativa, a fine turno.
- Verrà mantenuto al minimo l'abbagliamento, facendo in modo che il fascio luminoso rispetto alla verticale non sia superiore ai 70°.

Allegato A – corpi illuminanti utilizzati (o equivalenti approvati)

Di seguito vengono riportate le schede tecniche dei prodotti considerati in fase progettuale. Tutti gli apparecchi citati sono da intendersi come prodotti di riferimento, i corpi illuminanti che verranno utilizzati in fase di costruzione saranno quelli o equivalenti approvati.

TRTLIGHTING

ASPECT
32 LED

IP66
Ingress Protection

IK08
Impact Resistance

8kg Weight

Electrical Class I

0.059m² Wind Area

-20 to 40°C Ambient

LED Light Source

MADE IN BRITAIN

DARKSKY APPROVED Reduce light pollution

Certified by DarkSky.org

DarkSky International approved Aspect 32 LED. Compliant when using a colour temperature of 3000K or below and at zero degree tilt.

SPECIFICATION

- ✓ LED colour temperature PC-Amber*, 2200K, 2700K, 3000K, 4000K *(or 5700K Zebra only)*
- ✓ Colour rendering index >70 (*>55)
- ✓ Projected L90 after 100,000 hours
- ✓ Power factor >0.95 at full load
- ✓ Polyester powder coat finish in light grey, dark grey, black or a bespoke colour
- ✓ High quality high pressure die cast LM6 aluminium components
- ✓ Stainless steel fixing screws with stainless steel inserts in pivot
- ✓ Toughened flat safety glass cover
- ✓ Replaceable gear tray without the need for tools
- ✓ CLO available
- ✓ PowerSet feature - Field adjustable, integral power output selection device (optional)
- ✓ Controls - NEMA 3, 7, Miniature Photocell and Zhaga Book 18 (SR) socket
- ✓ Part Night Dimming (PND) with manual dimming override option
- ✓ Dim level 10-100%
- ✓ DALI compatible for use with CMS
- ✓ Optional surge protection 10kV/10kA
- ✓ Post top mounting 60mm or 76mm
  Side entry mounting of 34mm, 42mm, 60mm or 76mm
- ✓ Post top inclination of 0°, +5° and +10°
  Side entry inclination of -10°, -5°, 0°, +5° and +10°
- ✓ Tool-less access
- ✓ UMSUG codes available for full product range

PowerSet

The **PowerSet** module allows on site power adjustment providing maximum flexibility both in-situ and for stock holding. Each module accommodates the selection of any one of the range of UMSUG coded system powers for Aspect 32 LED.

ASPECT 32 LED

TRTLIGHTING

RANGE OVERVIEW

Type	System Power	Road Optics	Area Optics	CCT	Lumen Output	CRI
AS32	34-95W	✓	✓	PC-Amber*, 2200K, 2700K, 3000K or 4000K	Up to 13,058lm	>70 (*>55)
Type	**System Power**	**Left Distribution**	**Right Distribution**	**CCT**	**Lumen Output**	**CRI**
AS32 (Zebra)	34-95W	✓	✓	3000K, 4000K or 5700K	Up to 13,058lm	>70

ELECTRICAL CHARACTERISTICS

System Power	34-95W
LED CCT	PC-Amber*, 2200K, 2700K, 3000K, 4000K *(or 5700K Zebra only)*
LED CRI	>70 (*>55)
Lumen Output	Up to 13,058lm
Lumen Maintenance	Projected L90 after 100,000 hours
Driver Current	332-940mA
Driver Output	Constant current output with AM dimming
Power Factor (Full Load/Half Load)	0.95/0.90
Operational Voltage	220-240VAC rms
Operating Frequency	50/60Hz
Inrush Current (Apk/50%-µS)	57A/210µS
Running Current (Max)	395mA
Surge Protection (COM/DIF)	10kV/6kV
Additional Surge Protection (on request)	10kV/10kA
Lighting Controls Options	NEMA 3, 7, Miniature Photocell, Zhaga Book 18 (SR) socket, PND & CMS compatible
Dimming Protocols	DALI

MECHANICAL CHARACTERISTICS

Housing Material	High pressure die cast aluminium
Cover Material	Toughened flat safety glass
Lens Material	PMMA
Housing Finish	Chromate free pre-treatment, polyester powder coat, light grey (RAL9006), dark grey (RAL7022), black (RAL9005) or bespoke colours on request
Ingress Protection Rating	IP66
Weight	8.0kg
Wind Area	0.059m²
Impact Resistance Rating	IK08
Mounting Methods	Post top 60mm or 76mm/side entry 34mm, 42mm, 60mm or 76mm
Mounting Inclination	-10°, -5°, 0°, 5°, 10°
Photometric Centre	350mm (to centre of PCB)

SHIELD OPTIONS

Rear	81BAF70458
Front	81BAF70459
Side	81BAF70510

All information detailed within this datasheet is accurate at the date of issue.
The information provided is subject to change at our discretion. If any questions arise or extra information is required, please contact TRT Lighting directly. Aspect 32 LED Datasheet issue July 2025.

FOR MORE INFORMATION
+44 (0) 1527 521 162
www.trtlighting.co.uk

TRTLIGHTING

ASPECT
48 LED

IP66
Ingress Protection

IK08
Impact Resistance

8kg Weight

Electrical Class I

0.059m² Wind Area

-20 to 40°C Ambient

LED Light Source

MADE IN BRITAIN

DARKSKY APPROVED Reduce light pollution

Certified by DarkSky.org

DarkSky International approved Aspect 48 LED. Compliant when using a colour temperature of 3000K or below and at zero degree tilt.

SPECIFICATION

- ✓ PC-Amber*, 2200K, 2700K, 3000K, 4000K *(or 5700K Zebra only)*
- ✓ Colour rendering index >70 (*>55)
- ✓ Projected L90 after 100,000 hours
- ✓ Power factor >0.95 at full load
- ✓ Polyester powder coat finish in light grey, dark grey, black or a bespoke colour
- ✓ High quality high pressure die cast LM6 aluminium components
- ✓ Stainless steel fixing screws with stainless steel inserts in pivot
- ✓ Toughened flat glass cover
- ✓ Replaceable gear tray without the need for tools
- ✓ CLO available
- ✓ PowerSet feature - Field adjustable, integral power output selection device (optional)
- ✓ Controls - NEMA 3, 7, Miniature Photocell and Zhaga Book 18 (SR) socket
- ✓ Part Night Dimming (PND) with manual dimming override option
- ✓ Dim level 10-100%
- ✓ DALI compatible for use with CMS
- ✓ Optional surge protection 10kV/10kA
- ✓ Post top mounting 60mm or 76mm
  Side entry mounting of 34mm, 42mm, 60mm or 76mm
- ✓ Post top inclination of 0°, +5° and +10°
  Side entry inclination of -10°, -5°, 0°, +5° and +10°
- ✓ Tool-less access
- ✓ UMSUG codes available for full product range

PowerSet

The **PowerSet** module allows on site power adjustment providing maximum flexibility both in-situ and for stock holding. Each module accommodates the selection of any one of the range of UMSUG coded system powers for Aspect 48 LED.

ASPECT 48 LED

TRTLIGHTING

RANGE OVERVIEW

Type	System Power	Road Optics	Area Optics	CCT	Lumen Output	CRI
AS48	63-130W	✓	✓	PC-Amber*, 2200K, 2700K, 3000K or 4000K	Up to 18,623lm	>70 (*>55)
Type	**System Power**	**Left Distribution**	**Right Distribution**	**CCT**	**Lumen Output**	**CRI**
AS48 (Zebra)	63-130W	✓	✓	3000K, 4000K or 5700K	Up to 18,623lm	>70

ELECTRICAL CHARACTERISTICS

System Power	63-130W
LED CCT	PC-Amber*, 2200K, 2700K, 3000K, 4000K *(or 5700K Zebra only)*
LED CRI	>70 (*>55)
Lumen Output	Up to 18,623lm
Lumen Maintenance	Projected L90 after 100,000 hours
Driver Current	440-882mA
Driver Output	Constant current output with AM dimming
Power Factor (Full Load/Half Load)	0.95/0.90
Operational Voltage	220-240VAC rms
Operating Frequency	50/60Hz
Inrush Current (Apk/50%-µS)	62A/330µS
Running Current (Max)	540mA
Surge Protection (COM/DIF)	10kV/6kV
Additional Surge Protection (on request)	10kV/10kA
Lighting Controls Options	NEMA 3, 7, Miniature Photocell, Zhaga Book 18 (SR) socket, PND and CMS compatible
Dimming Protocols	DALI

MECHANICAL CHARACTERISTICS

Housing Material	High pressure die cast aluminium
Cover Material	Toughened flat safety glass
Lens Material	PMMA
Housing Finish	Chromate free pre-treatment, polyester powder coat, light grey (RAL9006), dark grey (RAL7022), black (RAL9005) or bespoke colours on request
Ingress Protection Rating	IP66
Weight	8.0kg
Wind Area	0.059m²
Impact Resistance Rating	IK08
Mounting Methods	Post top 60mm or 76mm/side entry 34mm, 42mm, 60mm or 76mm
Mounting Inclination	-10°, -5°, 0°, 5°, 10°
Photometric Centre	350mm (to centre of PCB)

SHIELD OPTIONS

Rear	81BAF70458
Front	81BAF70459
Side	81BAF70510

All information detailed within this datasheet is accurate at the date of issue.
The information provided is subject to change at our discretion. If any questions arise or extra information is required, please contact TRT Lighting directly. Aspect 48 LED Datasheet issue July 2025.

FOR MORE INFORMATION
+44 (0) 1527 521 162
www.trtlighting.co.uk

TRTLIGHTING

ASPECT
96 LED

IP66
Ingress Protection

IK08
Impact Resistance

9.2kg Weight

Electrical Class I

0.068m² Wind Area

-20 to 40°C Ambient

LED Light Source

MADE IN BRITAIN

DARKSKY APPROVED Reduce light pollution

Certified by DarkSky.org

DarkSky International approved Aspect 96 LED. Compliant when using a colour temperature of 3000K or below and at zero degree tilt.

SPECIFICATION

- ✓ LED colour temperature PC-Amber*, 2200K, 2700K, 3000K or 4000K
- ✓ Colour rendering index >70 (*>55)
- ✓ Projected L90 after 100,000 hours
- ✓ Power factor >0.95 at full load
- ✓ Polyester powder coat finish in light grey, dark grey, black or a bespoke colour
- ✓ High quality high pressure die cast LM6 aluminium components
- ✓ Stainless steel fixing screws with stainless steel inserts in pivot
- ✓ Toughened flat glass cover
- ✓ Replaceable gear tray without the need for tools
- ✓ CLO available
- ✓ PowerSet feature - Field adjustable, integral power output selection device (optional)
- ✓ Controls - NEMA 3, 7, Miniature Photocell and Zhaga Book 18 (SR) socket
- ✓ Part Night Dimming (PND) with manual dimming override option
- ✓ Dim level 10-100%
- ✓ DALI compatible for use with CMS
- ✓ Optional surge protection 10kV/10kA
- ✓ Post top mounting 60mm or 76mm
  Side entry mounting of 34mm, 42mm, 60mm or 76mm
- ✓ Post top inclination of 0°, +5° and +10°
  Side entry inclination of -10°, -5°, 0°, +5° and +10°
- ✓ Tool-less access
- ✓ UMSUG codes available for full product range

PowerSet

The **PowerSet** module allows on site power adjustment providing maximum flexibility both in-situ and for stock holding. Each module accommodates the selection of any one of the range of UMSUG coded system powers for Aspect 96 LED.

ASPECT 96 LED

TRTLIGHTING

RANGE OVERVIEW

Type	System Power	Road Optics	Area Optics	CCT	Lumen Output	CRI
AS96	107-208W	✓	✓	PC-Amber*, 2200K, 2700K, 3000K or 4000K	Up to 31,959lm	>70 (*>55)

ELECTRICAL CHARACTERISTICS

System Power	107-208W
LED CCT	PC-Amber*, 2200K, 2700K, 3000K or 4000K
LED CRI	>70 (*>55)
Lumen Output	Up to 31,959lm
Lumen Maintenance	Projected L90 after 100,000 hours
Driver Current	393-730mA
Driver Output	Constant current output with AM dimming
Power Factor (Full Load/Half Load)	0.95/0.90
Operational Voltage	220-240VAC rms
Operating Frequency	50/60Hz
Inrush Current (Apk/50%-µS)	80A/225µS
Running Current (Max)	870mA
Surge Protection (COM/DIF)	10kV/6kV
Additional Surge Protection (on request)	10kV/10kA
Lighting Controls Options	NEMA 3, 7, Miniature Photocell, Zhaga Book 18 (SR) socket, PND and CMS compatible
Dimming Protocols	DALI

MECHANICAL CHARACTERISTICS

Housing Material	High pressure die cast aluminium
Cover Material	Toughened flat safety glass
Lens Material	PMMA
Housing Finish	Chromate free pre-treatment, polyester powder coat, light grey (RAL9006), dark grey (RAL7022), black (RAL9005) or bespoke colours on request
Ingress Protection Rating	IP66
Weight	9.2kg
Wind Area	0.068m²
Impact Resistance Rating	IK08
Mounting Methods	Post top 60mm or 76mm/side entry 34mm, 42mm, 60mm or 76mm
Mounting Inclination	-10°, -5°, 0°, 5°, 10°
Photometric Centre	450mm (to centre of PCB)

SHIELD OPTIONS

Universal Front/Rear	81BAF70458
Side	81BAF70657

All information detailed within this datasheet is accurate at the date of issue.
The information provided is subject to change at our discretion. If any questions arise or extra information is required, please contact TRT Lighting directly. Aspect 96 LED Datasheet issue July 2025.

FOR MORE INFORMATION
+44 (0) 1527 521 162
www.trtlighting.co.uk

A-Line
AL020LPML

20 W - Non-dimming - Clear polycarbonate cover - Medium distribution

Multi-purpose and corrosion-resistant luminaires

- Robust and durable extruded aluminium body dissipates heat, ensuring long control gear life in higher ambient temperatures
- Impact-resistant, fire-retardant polycarbonate cover

Lighting control system	Emergency system	Optic	Impact rating	Lumen output	Cover fixings
Non-dimming	Non-emergency	Clear polycarbonate cover	IK10	3,670	A4 stainless steel slotted

Lighting management

Lighting control system	**Non-dimming**	Emergency system	**Non-emergency**

Specification

Mounting	**Surface**	IP rating	**IP66**
Impact rating	**IK10**	Weight	**6 kg**
Protection class	**Class 1**	Warranty	**5 years**

A-Line
AL020LPML

Lighting

Optic	**Clear polycarbonate cover**	Distribution	**Medium**
Lumen output	**3,670 lm**	Efficacy	**166.8 LL/CW**

Power

LED power	**20 W**	Circuit power	**22 W**
Inrush current peak	**13 A**	Inrush current time	**270 µs**
Mains voltage	**220-240 V**	Running current at 240 V	**0.09 A**
Mains frequency	**50/60 Hz**		

Construction

Housing	**Extruded aluminium body with die-cast aluminium ends**	Finish	**Full polyester powder coat**
Body colour	**White**	Optical assembly	**Impact-resistant fire-retardant polycarbonate cover**
Gasket	**Long life silicone gasket**	Cover fixings	**A4 stainless steel slotted**

Installation

Connection	**Screw terminal (fused - 3 A)**	Through wiring	**No through wiring**

LED characteristics

CRI	**80+**	Colour temperature	**4000 K**
Rated life (hours)	**100 K - L80/B10**	LED protection	**LUX Guard**
Driver efficiency	**>85%**	Replaceable light source	**Yes**
Power factor	**>0.95**	MacAdam elipse	**3 Step**

Compliance

UKCA	**Yes**	CE	**Yes**
Energy efficiency class	**This product contains a light source of energy efficiency class B**	Part L compliant	**Yes**
Food production standards	**IFS","HACCP","BRC**	MOD compliance	**JSP482 Chapter 8 Document for 'Category C' areas**

LED lifetimes

L70/B10	**100,000 h**	L80/B10	**100,000 h**
L90/B10	**60,000 h**	60 kHr value (TM-21)	**L90/B10**

Maximum loading of circuit breaker

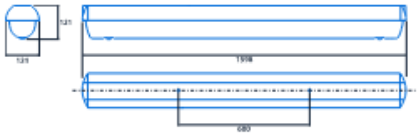
Number of gear units	**1**	B10	**15**
B16	**24**	C10	**25**
C16	**40**		

A-Line
AL020LPML

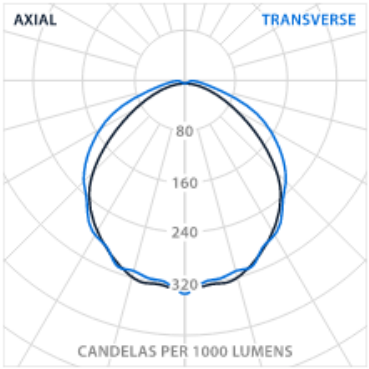
Temperature ratings

Minimum operating temperature	-20°C	Maximum operating temperature	50°C

Dimensions



Photometric Guide



Accessories

Product code	Description	Weight
IK6388	Hook suspension kit - Two stainless steel hooks (including nuts and sealing washers) for chain suspension	0.05 kg
IK6389	IP66 gland kit - Weatherproof nylon gland (including nuts and sealing washers) for entry of flexible cables	0.02 kg
IK6390	Conduit entry kit - IP66 20 mm conduit suspension sealing washer kit	0.01 kg
IK6391	Rod suspension kit - IP66 10 mm diameter rod sealing washer kit	0.01 kg

Realta Zero Wide
RL07W3

7W - External - Emergency - Graphite - Wide distribution -Polycarbonate cover - 3000 K / 2700K

High performance luminaires designed to minimise light pollution and energy consumption

- Strong high-pressure die-cast LM2 aluminium body with high efficiency prismatic polycarbonate front cover
- Wide distribution
- Highly specular, multi-faceted injection moulded vacuum metallised reflector
- Excellent distribution with 0% upward light component
- Integral PIR and photocell to minimise energy usage

Lighting control system	Emergency system	Optic	LED power	Body colour	Distribution
Built in PIR and photocell	**Emergency**	**Prismatic cover**	**7 W**	**Graphite**	**Wide**

Lighting management

Lighting control system	**SmartScan External**	Emergency system	**Self contained**

Specification

Mounting	**Surface**	IP rating	**IP66**
Impact rating	**IK10/IK11**	Weight	**TBC: 2 kg**
Max presence detection height	**8 m**		
Warranty	**5 years**		

Realta Zero Wide
RL07W3

Lighting

Optic	**Prismatic cover**	Distribution	**Wide**
Lumen output	**1085 lm**	Efficacy	**120.56 LL/CW**
External upward light	**0% upward light**		

Emergency data

Emergency lumen output	**385 lm**	Emergency type	**Maintained**
Emergency duration	**3 hours**	Battery specification	**Nickel Metal Hydride (NiMH) or Lithium**
Self-testing note			

Power

LED power	**7 W**	Circuit power	**9W**
Mains voltage	**220-240 V**		
Mains frequency	**50/60 Hz**		

Construction

Housing	**Strong high pressure die-cast LM2 aluminium body**	Finish	**Full polyester powder coat**
Body colour	**Graphite**	Optical assembly	**High efficiency polycarbonate cover**
Gasket	**Black EPDM closed cell gasket**	Cover fixings	**Stainless steel Pozidriv**

Installation

Mounting detail	**Wall mounting (column mounted with optional adapters)**	Connection	**Screw terminal (fused - 3 A)**

LED characteristics

CRI	**70+**	Colour temperature	**3000 K / 2700K**
Rated life (hours)	**67 K - L80/B10**	LED protection	**LUX Guard**
Driver efficiency	**>80%**	Replaceable light source	**Yes**
Power factor	**>0.95**	MacAdam elipse	**3 Step**

Realta Zero Wide
RL07W3

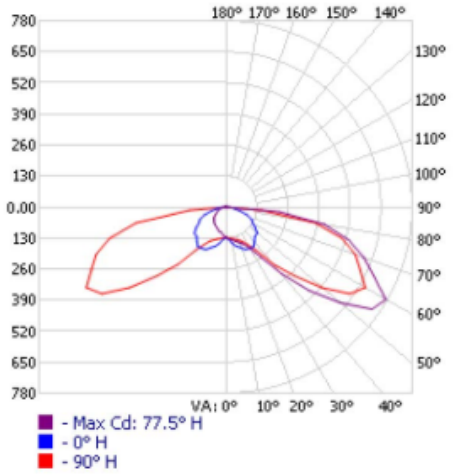
Compliance

UKCA	Yes	CE	Yes
Energy efficiency class	This product contains a light source of energy efficiency class A	SmartScan wireless standards compliance	Europe: EN 300 220-1 V2.4.1/ EN 301 489-3 V1.6.1. Australasia: ACMA 2014 Radio Communication Standard 2014. Thorlux Patented Wireless Technology - GB2575724

LED lifetimes

L70/B10	100,000 h	L80/B10	67,000 h
L90/B10	34,000 h	60 kHr value (TM-21)	L82/B10

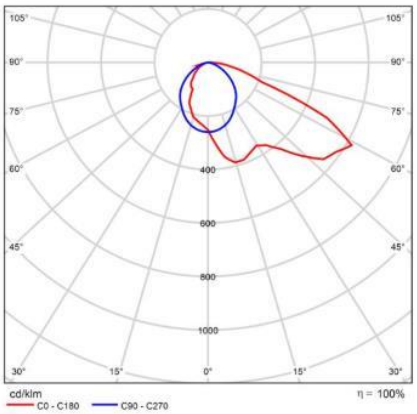
Photometric Guide



Product data sheet

Thorlux Lighting - Realta - 18W - Area Distribution - 2700K

Article No.	RL18A27
P	20.0 W
Φ_{Lamp}	2860 lm
$\Phi_{Luminaire}$	2860 lm
η	100.00 %
Luminous efficacy	143.0 lm/W
CCT	2700 K
CRI	80
Index	X7/E



Polar LDC

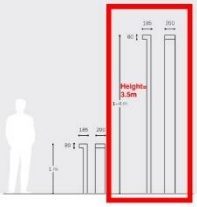
High-performance, robust luminaires designed to minimise light pollution, disruption to ecosystems, and energy consumption
Stylish and sleek IP66 and IK10 wall-mounted luminaires, comprising a high-pressure die-cast aluminium body and innovative one-piece polycarbonate lens and cover. Zero upward light and high efficacy make this an environmentally friendly and energy-efficient luminaire. Fast and simple to install.

Applications: Uniform pathway lighting for schools, hospitals, retail and other commercial environments. Forward throw optics are ideal for general area lighting.

FA

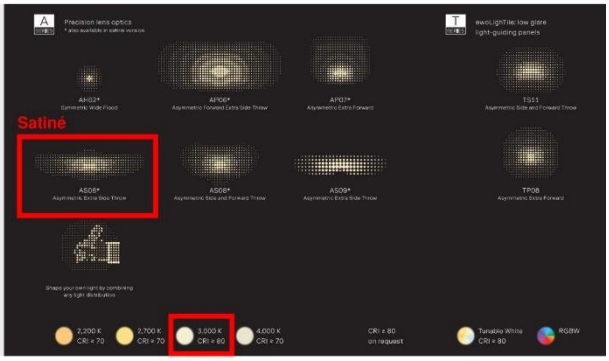
BOLLARDS FA170

Pedestrian path
Accent lighting



Configurator

IP66 RoHS IK09*
*IK10 on request, COR-TEN IK08



Housing

TBC: Material and colour TBC by Landscape Architect and Architect

Housing material	Aluminum die-cast* (A-Series optional COR-TEN)
Housing finish	Polyester powder coating (ewoECP upon request***)
Finish standard colour	Silver grey (RAL 9007 / OBI 702)**
Glass	Safety glass (ESG)
Mounting options	Pole
Installation	Gelbox for throughwiring upon request

* pole made of extruded aluminum profile
** other color on request
*** ewo does keep no stock (high quality of ewo-finishes, protect to outside exterior accounts, maintenance)

Measurements

Model	LPH [m] ①	a* ②	b* ③	Weight [kg] ④
FA170	1	0.04	0.20	18.5*
FA170	3.5m	0.04	0.20	8

① in 0.5 m steps
② projected envelope area [m²]
③ lateral envelope area [m²]
④ max. weight
0.07 pole included

* single version with aluminium pole LPH = 3 m and buried base
** single version with aluminium pole LPH = 4 m and buried base

Performance

Satiné

Optics	AH02	AP07	AS06	AS07	AS08	AS09	TS11	TP08
MacAdam ellipses (SDCM)				≤ 5 SDCM			≤ 5 SDCM	

Model	FA170	FA170
Light units	1	1
Luminous flux [lm]	340–2,590 **1323lm @ 300mA**	1,000

Electrical

	A-Series	T-Series
Protection class	I / II	I / II
Voltage [V], [Hz]	220–240, 50/60	220–240, 50/60
Current feed max. [mA]	~~500~~ **300mA**	225
LED power max. [W]	26 **17W**	12

Operating conditions

Lifetime	Visit the configurator for specific lifetime options

Driver

	A-Series	T-Series
Control options	DALI, Bluetooth, LiS	DALI
Programming (optional)	Emergency power supply (AC/DC) Stand-alone	
Control accessories	Further accessories on request	
Software	connexx light management software for remote management of intelligent luminaire clusters	

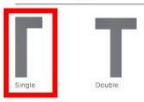
Accessories

ewoLightLayers (optical accessories)

Backlight shield

Anti-Glare Grid 60° / 70 °

Available designs



Single

Double

Surface

Pole luminaire / bollard: polyester powder coated

Pole luminaire / bollard: COR-TEN steel

1st edition, September 2023; Copyright: © ewo sr/GmbH

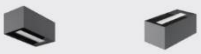
ewo

FA

Note: Where a luminaire tag denotes "/E", it will function as a maintained emergency luminaire (used in general lighting and emergency lighting mode). A 2hr remote emergency DALI battery conversion pack is required <3m from the luminaire. An LED battery status light is required adjacent or integral to luminaire. Luminaire must be run at >10% output in emergency mode.

L2/E

WALL / CEILING
FA100-C
FA100-WD
FA100-WU



Configurator

IP66 RoHS IK09*
*(IK10 on request)

A-Series	A-Series	T-Series
FA100	FA100	FA100
8 LEDs	16 LEDs	32 LEDs

Housing

TBC: Material and colour TBC by Landscape Architect and Architect

Housing material	Aluminum die-cast
Housing finish	Polyester powder coating (ewoECP upon request**)
Finish standard colour	Silver grey (RAL 9007 / DB 702)*
Glass	Safety glass (ESG)
Mounting options	Wall, ceiling
Installation	Gelbox for throughwiring upon request

* other color on request
** ewoEcoPaint powder coatings offer quality also pre-treatment, protection include extreme corrosion resistance

Measurements

Model	LPH [m] ①	A* ②	B* ③	Weight [kg] ④
FA100-WD	/	0.02	0.02	2.5
FA100-C	/	/	0.02	2.5

① protected entrance area [m²]
② lateral entrance area [m²]
④ max. weight

Performance

Satiné

Optics	AH02	AP07	APC07	AS06	AS07	AS08	AS09	TS11	TP08
MacAdam ellipses (SDCM)					≤ 5 SDCM			≤ 5 SDCM	

948lm @ 350mA

Model	FA100-WD	FA100-WU	FA100-C	FA100-WD	FA100-WU	FA100-C
Light units	1	1	1	1	1	1
Luminous flux [lm]	315–3,250	315–3,250	420–3,300	1,000	1,000	1,000

Electrical

	A-Series	T-Series
Protection class	I / II	I / II
Voltage [V], [Hz]	220–240, 50/60	220–240, 50/60
Current feed max. [mA]	500 **350mA**	225
LED power max. [W]	26 **10W**	12

Operating conditions

Lifetime	Visit the configurator for specific lifetime options

Accessories

ewoLightLayers (optical accessories)

Backlight shield — Anti-Glare Grid 60° / 70 °

Driver

	A-Series	T-Series
Control options	DALI, 1-10V, DMX, DSI	DALI
Programming (optional)	Stand-alone	
Control accessories	Further accessories on request	
Software	connexx light management software for remote management of intelligent luminaire clusters	

Available designs

WD (Wall Downlight) — WU (Wall Uplight) — C (Ceiling)

1st edition, September 2023; Copyright: © ewo srl/GmbH

134-1625

DOC110 LED

we-ef

Description

IP66, Class I. Class II on request. IK07. Marine-grade, die-cast aluminium alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® gasket. Safety glass lens. Two cable entries. Integral EC electronic converter in thermally separated compartment. CAD-optimised optics for superior illumination and glare control. OLC® One LED Concept. Factory installed LED circuit board. The luminaire is factory- sealed and does not need to be opened during the installation.
Optional 2200 K version available. To be specified at time of ordering.

Suitable for mounting up to max. 40 mm ceiling thickness. A pre-installation blockout, proud or flush, is available and recommended for mounting in concrete ceilings. To be ordered separately.

The luminaire is not suitable for chlorine containing environments e.g. swimming pool. Special version suitable for chlorine containing environments, on request. Must be specified at time of ordering.

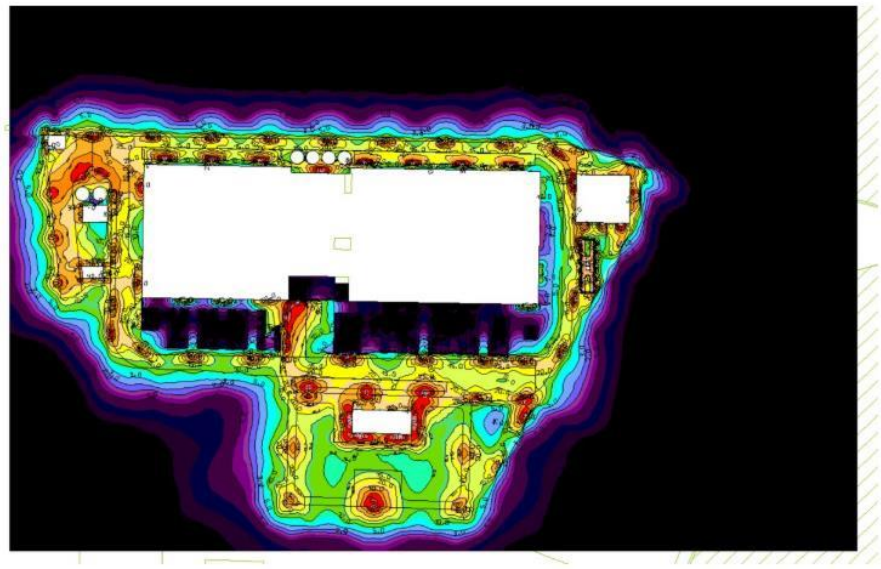
Weight	1.30 kg
Light distribution	symmetric, wide beam [B]
Light source	LED-6/12W / 700 mA - 3000 K
CRI	80
Power supply	EC
LEDs	6
Rated input power	14.5 W
Nominal Lumen (lm)	
LED Lumen	290
Total Lumen	1740
Tj	85
Rated lumens (lm)	
LED Lumen	224.5
Total Lumen	1347.1
Ta	25

WE-EF LEUCHTEN GmbH
Töpinger Straße 16, 29646 Bispingen, Germany - Phone: +49 5194 909-0
info@we-ef.com - https://we-ef.com
Subject to technical changes and errors. - Generated on 03/04/2025

Allegato B – Relazione di calcolo illuminazione esterna

Il presente allegato riporta i risultati dei calcoli illuminotecnici del progetto, sviluppati mediante software dedicato, al fine di verificare i livelli di illuminamento e la conformità ai requisiti normativi.

Date 26/06/2026



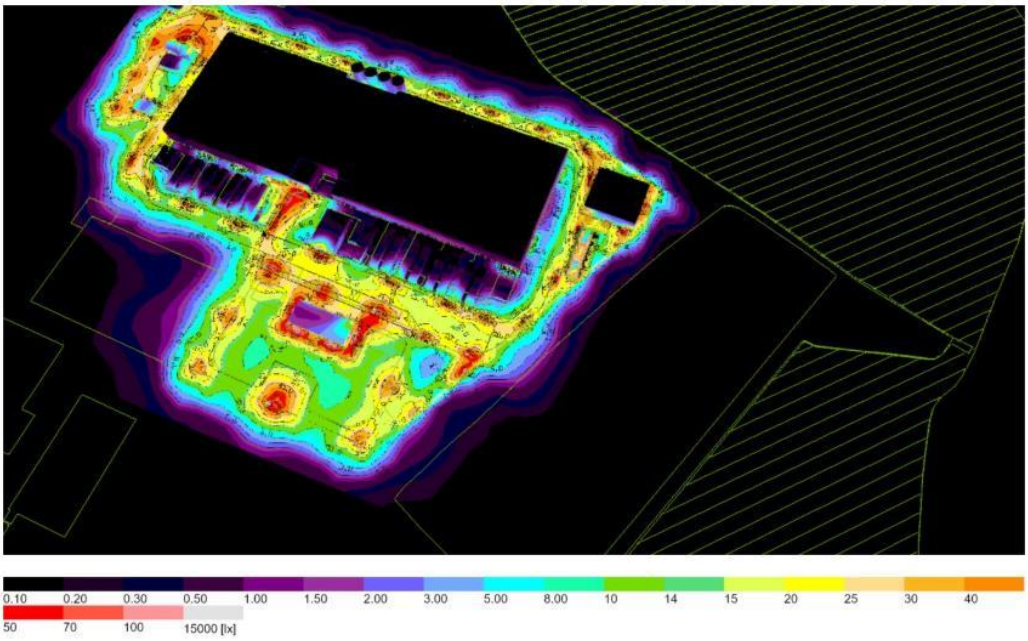
584760-R14-JA

North-East corner:
X1 luminaires with internal back shields - IBS
X1 - without any shields
X1BS - with external back shield
X1IS - with internal back shield

Please see our Lighting Design Terms and Conditions at www.thorlux.com/terms

Created with DIALux

Images


0.10
0.20
0.30
0.50
1.00
1.50
2.00
3.00
5.00
8.00
10
14
15
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25
30
40
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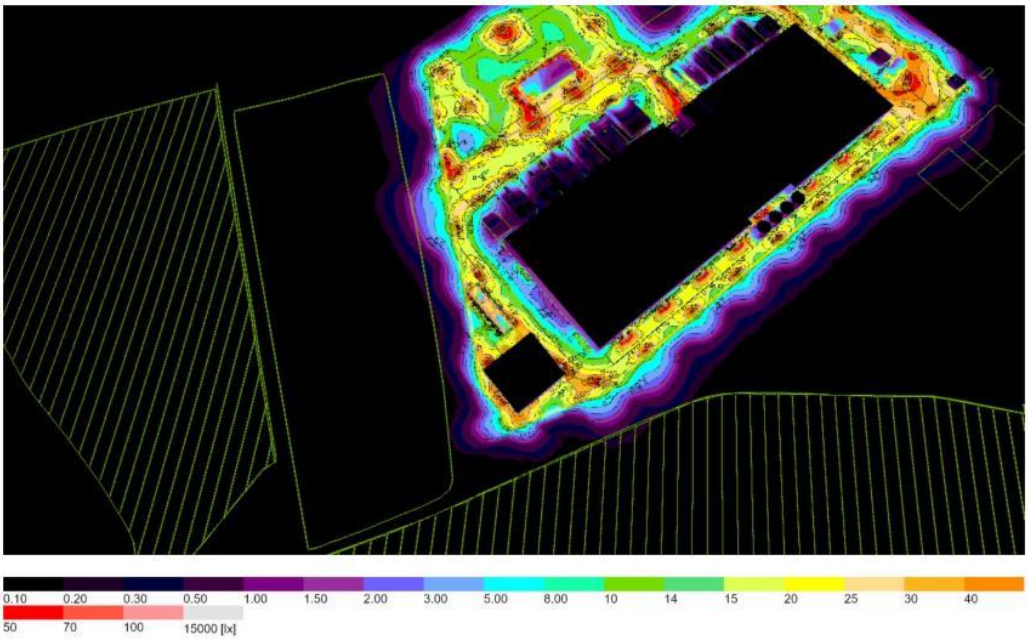
70
100
15000 [lx]

3D

Images


0.10
0.20
0.30
0.50
1.00
1.50
2.00
3.00
5.00
8.00
10
14
15
20
25
30
40
50
70
100
15000 [lx]

3D

Luminaire list

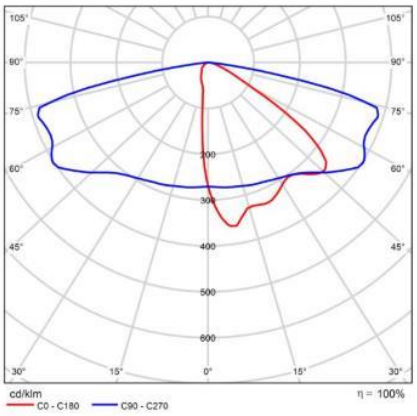
Φ_{total}	P_{total}	Luminous efficacy
872952 lm	6441.0 W	135.5 lm/W

pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy	Index
15	Thorlux Lighting	RL18A27	Realta - 18W - Area Distribution - 2700K	20.0 W	2860 lm	143.0 lm/W	X7/E
7	Thorlux Lighting	AS32_LED_45W_GR5_BS_3000K_FG	AS32_LED_45W_GR5_BS_3000K_FG	45.0 W	5117 lm	113.7 lm/W	X1BS
39	Thorlux Lighting	AS48_LED_75W_GR5_3000K_FG	AS48_LED_75W_GR5_3000K_FG	75.0 W	10484 lm	139.8 lm/W	X2
14	Thorlux Lighting	AS96_LED_155W_GA2_3000K_FG	AS96_LED_155W_GA2_3000K_FG	155.0 W	21481 lm	138.6 lm/W	X3
8	Thorlux Lighting	N/A	A32_GEN2_LED_43W_GR5_(Blue)_G0_IBS_3000K_FG	43.0 W	4746 lm	110.4 lm/W	X1IS
43	Thorlux Lighting	RL07W3	Realta 7W Wide Area Lens	9.0 W	1085 lm	120.6 lm/W	X5/E

Product data sheet

Thorlux Lighting - A32_GEN2_LED_43W_GR5_(Blue)_G0_IBS_3000K_FG

Article No.	N/A
P	43.0 W
Φ_{Lamp}	4746 lm
$\Phi_{Luminaire}$	4746 lm
η	100.00 %
Luminous efficacy	110.4 lm/W
CCT	3000 K
CRI	70
Index	X1IS

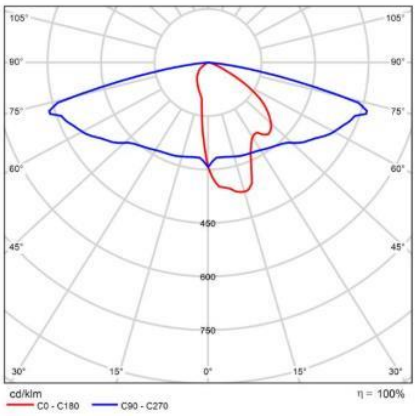


Polar LDC

Product data sheet

Thorlux Lighting - AS32_LED_45W_GR5_BS_3000K_FG

Article No.	AS32_LED_45W_GR5_BS_3000K_FG
P	45.0 W
Φ_{Lamp}	5117 lm
$\Phi_{Luminaire}$	5117 lm
η	100.00 %
Luminous efficacy	113.7 lm/W
CCT	3000 K
CRI	70
Index	X1BS

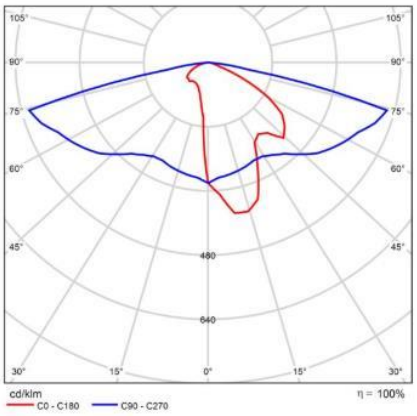


Polar LDC

Product data sheet

Thorlux Lighting - AS48_LED_75W_GR5_3000K_FG

Article No.	AS48_LED_75W_GR5_3000K_FG
P	75.0 W
Φ_{Lamp}	10484 lm
$\Phi_{Luminaire}$	10484 lm
η	100.00 %
Luminous efficacy	139.8 lm/W
CCT	3000 K
CRI	70
Index	X2

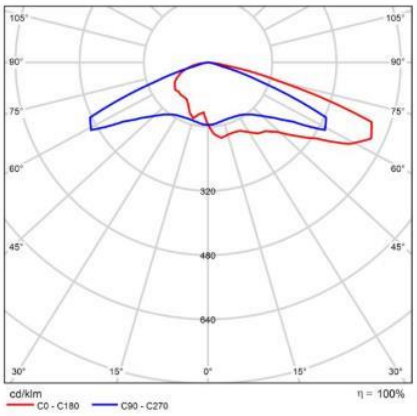


Polar LDC

Product data sheet

Thorlux Lighting - AS96_LED_155W_GA2_3000K_FG

Article No.	AS96_LED_155W_GA2_3000K_FG
P	155.0 W
Φ_{Lamp}	21481 lm
$\Phi_{Luminaire}$	21481 lm
η	100.00 %
Luminous efficacy	138.6 lm/W
CCT	3000 K
CRI	70
Index	X3

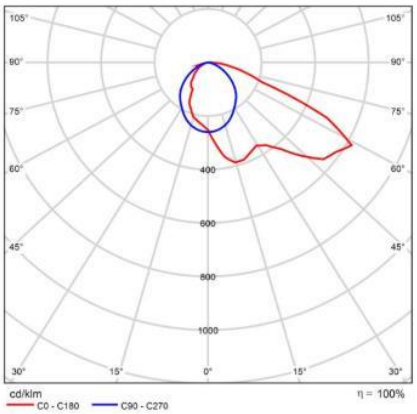


Polar LDC

Product data sheet

Thorlux Lighting - Realta - 18W - Area Distribution - 2700K

Article No.	RL18A27
P	20.0 W
Φ_{Lamp}	2860 lm
$\Phi_{Luminaire}$	2860 lm
η	100.00 %
Luminous efficacy	143.0 lm/W
CCT	2700 K
CRI	80
Index	X7/E



Polar LDC

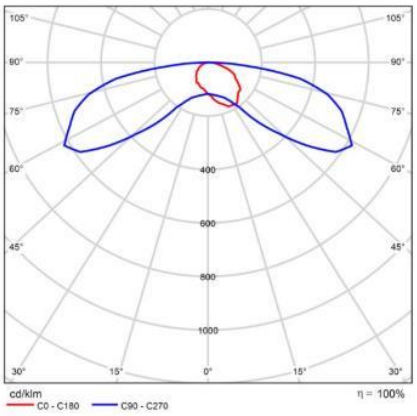
High-performance, robust luminaires designed to minimise light pollution, disruption to ecosystems, and energy consumption
Stylish and sleek IP66 and IK10 wall-mounted luminaires, comprising a high-pressure die-cast aluminium body and innovative one-piece polycarbonate lens and cover. Zero upward light and high efficacy make this an environmentally friendly and energy-efficient luminaire. Fast and simple to install.

Applications: Uniform pathway lighting for schools, hospitals, retail and other commercial environments. Forward throw optics are ideal for general area lighting.

Product data sheet

Thorlux Lighting - Realta 7W Wide Area Lens

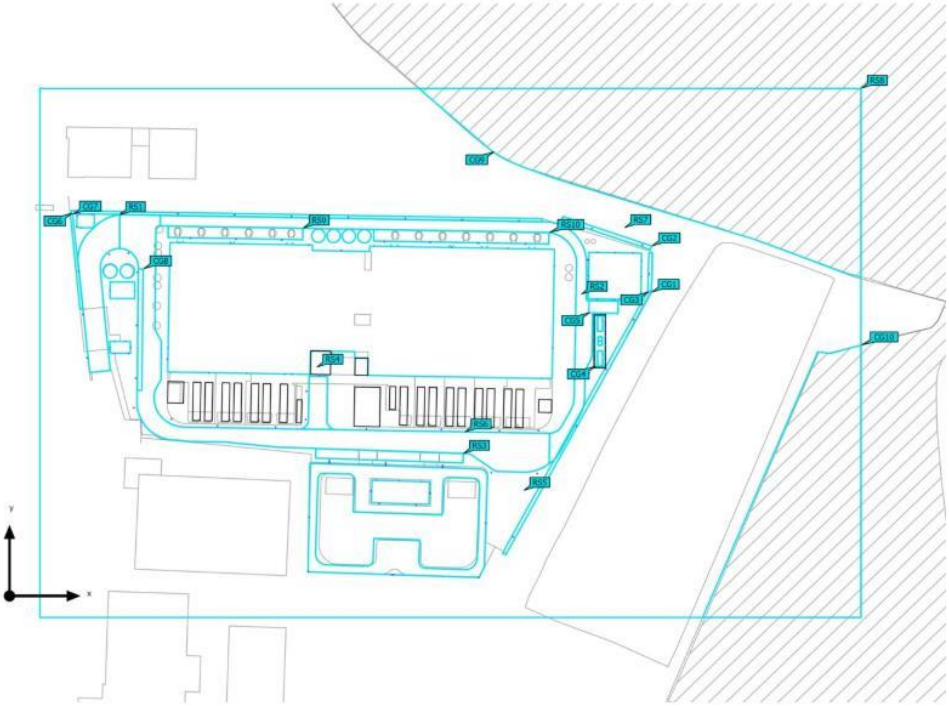
Article No.	RL07W3
P	9.0 W
Φ_{Lamp}	1085 lm
$\Phi_{Luminaire}$	1085 lm
η	100.00 %
Luminous efficacy	120.6 lm/W
CCT	3000 K
CRI	80
Index	X5/E



Polar LDC

Site 1 (Light scene 1)

Calculation objects



Site 1 (Light scene 1)

Calculation objects

Surface result objects

Properties	Ø	min	max	U_o (g_1)	g_2	Index
Entrance Perpendicular illuminance (adaptive) Height: 0.000 m	35.7 lx	16.4 lx	66.8 lx	0.46	0.25	RS1
Entrance Luminance Height: 0.000 m	2.28 cd/m²	1.04 cd/m²	4.25 cd/m²	0.46	0.24	RS1
HV Substation Perpendicular illuminance (adaptive) Height: 0.000 m	34.0 lx	9.83 lx	164 lx	0.29	0.060	RS5
HV Substation Luminance Height: 0.000 m	2.16 cd/m²	0.63 cd/m²	10.4 cd/m²	0.29	0.061	RS5
HV Substation Perpendicular illuminance (adaptive) Height: 0.000 m	15.2 lx	7.79 lx	44.1 lx	0.51	0.18	RS6
HV Substation Luminance Height: 0.000 m	0.87 cd/m²	0.45 cd/m²	2.53 cd/m²	0.52	0.18	RS6
Parking 2 Perpendicular illuminance (adaptive) Height: 0.000 m	30.8 lx	12.8 lx	109 lx	0.42	0.12	RS9
Parking 2 Luminance Height: 0.000 m	1.96 cd/m²	0.81 cd/m²	6.92 cd/m²	0.41	0.12	RS9
Parking 3 Perpendicular illuminance (adaptive) Height: 0.000 m	30.5 lx	9.88 lx	110 lx	0.32	0.090	RS10
Parking 3 Luminance Height: 0.000 m	1.94 cd/m²	0.63 cd/m²	6.97 cd/m²	0.32	0.090	RS10
Parking 4 Perpendicular illuminance (adaptive) Height: 0.000 m	33.6 lx	19.3 lx	82.6 lx	0.57	0.23	RS3

Site 1 (Light scene 1)

Calculation objects

Parking 4 Luminance Height: 0.000 m	2.14 cd/m²	1.23 cd/m²	5.26 cd/m²	0.57	0.23	RS3
Ramp Perpendicular illuminance (adaptive) Height: 0.000 m	42.9 lx	11.9 lx	82.7 lx	0.28	0.14	RS4
Ramp Luminance Height: 0.000 m	2.73 cd/m²	0.76 cd/m²	5.27 cd/m²	0.28	0.14	RS4
Road 1 Perpendicular illuminance (adaptive) Height: 0.000 m	24.9 lx	9.07 lx	73.6 lx	0.36	0.12	RS2
Road 1 Luminance Height: 0.000 m	1.58 cd/m²	0.58 cd/m²	4.69 cd/m²	0.37	0.12	RS2
Road 2 Perpendicular illuminance (adaptive) Height: 0.000 m	24.6 lx	9.97 lx	104 lx	0.41	0.096	RS7
Road 2 Luminance Height: 0.000 m	1.56 cd/m²	0.63 cd/m²	6.65 cd/m²	0.40	0.095	RS7
Surface result object 14 Perpendicular illuminance (adaptive) Height: 0.000 m	2.93 lx	0.00 lx	230 lx	0.00	0.00	RS8
Surface result object 14 Luminance Height: 0.000 m	0.17 cd/m²	0.00 cd/m²	13.2 cd/m²	0.00	0.00	RS8

Calculation surfaces

Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Carpark 1 Perpendicular illuminance Height: 0.000 m	35.3 lx	20.1 lx	60.1 lx	0.57	0.33	CG8
Park Area A Perpendicular illuminance Height: 0.000 m	0.021 lx	0.001 lx	0.40 lx	0.048	0.003	CG9

Site 1 (Light scene 1)

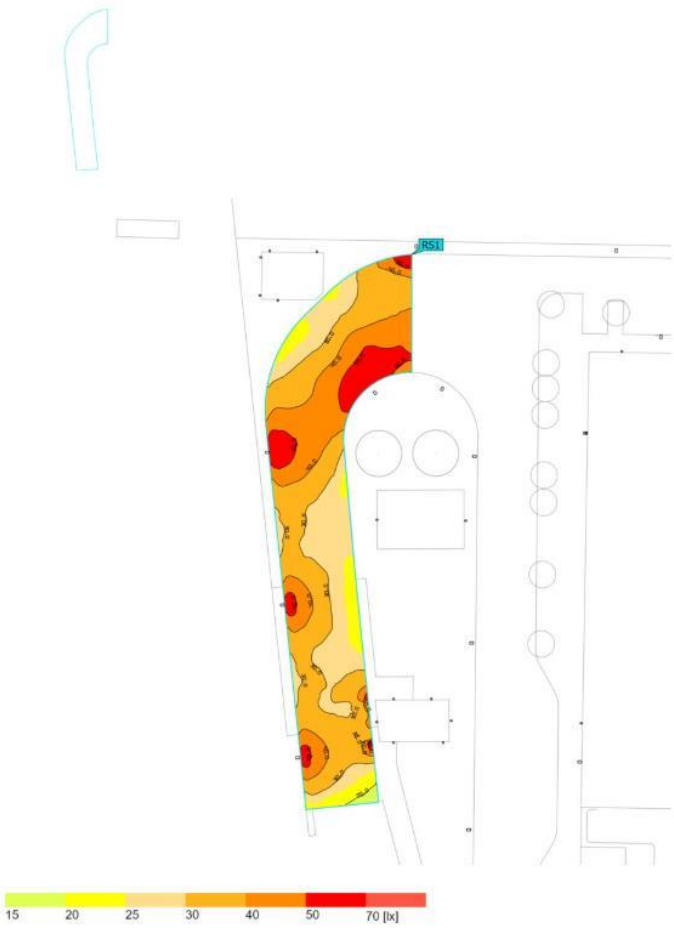
Calculation objects

Park Area B Perpendicular illuminance Height: 0.000 m	0.011 lx	0.003 lx	0.024 lx	0.27	0.13	CG10
Security Perimeter Perpendicular illuminance Height: 0.000 m	16.9 lx	4.89 lx	37.2 lx	0.29	0.13	CG1
Security Perimeter Perpendicular illuminance Height: 0.000 m	18.1 lx	5.21 lx	44.8 lx	0.29	0.12	CG2
Security Perimeter Perpendicular illuminance Height: 0.000 m	20.5 lx	9.02 lx	42.6 lx	0.44	0.21	CG3
Security Perimeter Perpendicular illuminance Height: 0.000 m	22.4 lx	9.30 lx	62.2 lx	0.42	0.15	CG6
Security Perimeter Perpendicular illuminance Height: 0.000 m	26.8 lx	9.84 lx	46.2 lx	0.37	0.21	CG7
WTB access road Perpendicular illuminance Height: 0.000 m	34.9 lx	10.9 lx	94.9 lx	0.31	0.11	CG5
WTB Gen Area Perpendicular illuminance Height: 0.000 m	131 lx	48.4 lx	229 lx	0.37	0.21	CG4

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Entrance

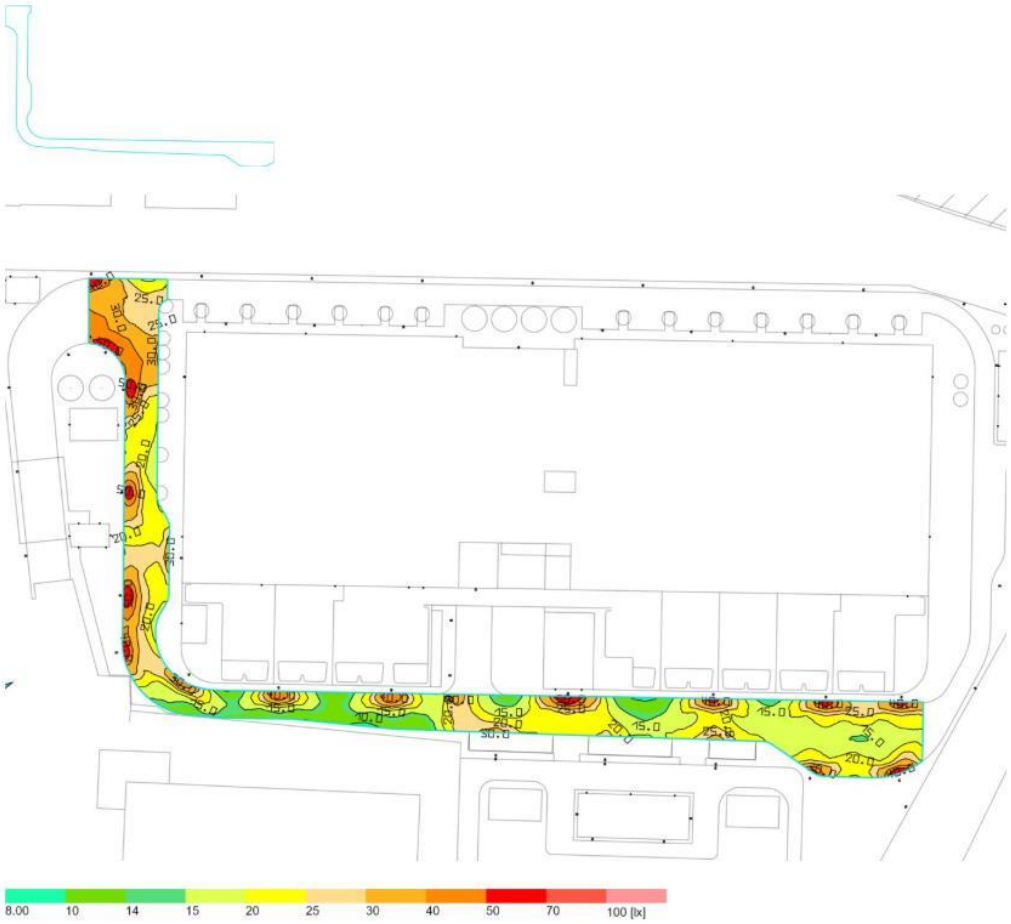


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Entrance Perpendicular illuminance (adaptive) Height: 0.000 m	35.7 lx	16.4 lx	66.8 lx	0.46	0.25	RS1

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Road 1

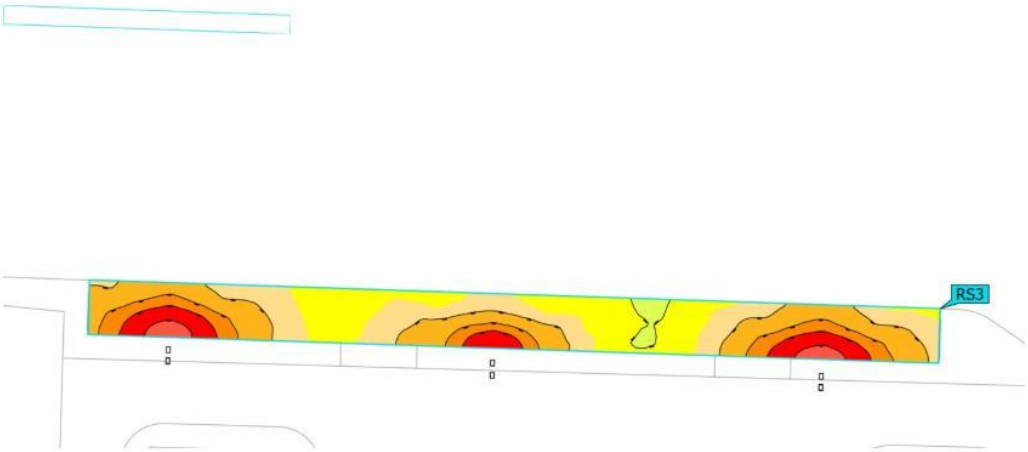


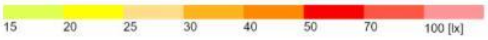
Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Road 1 Perpendicular illuminance (adaptive) Height: 0.000 m	24.9 lx	9.07 lx	73.6 lx	0.36	0.12	RS2

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Parking 4



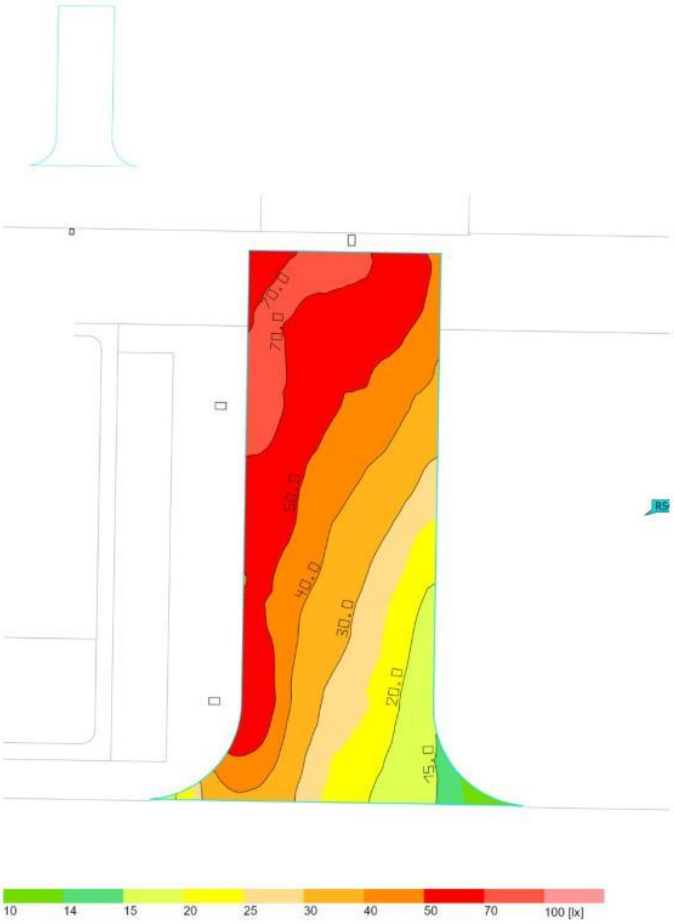


Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Parking 4 Perpendicular illuminance (adaptive) Height: 0.000 m	33.6 lx	19.3 lx	82.6 lx	0.57	0.23	RS3

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Ramp

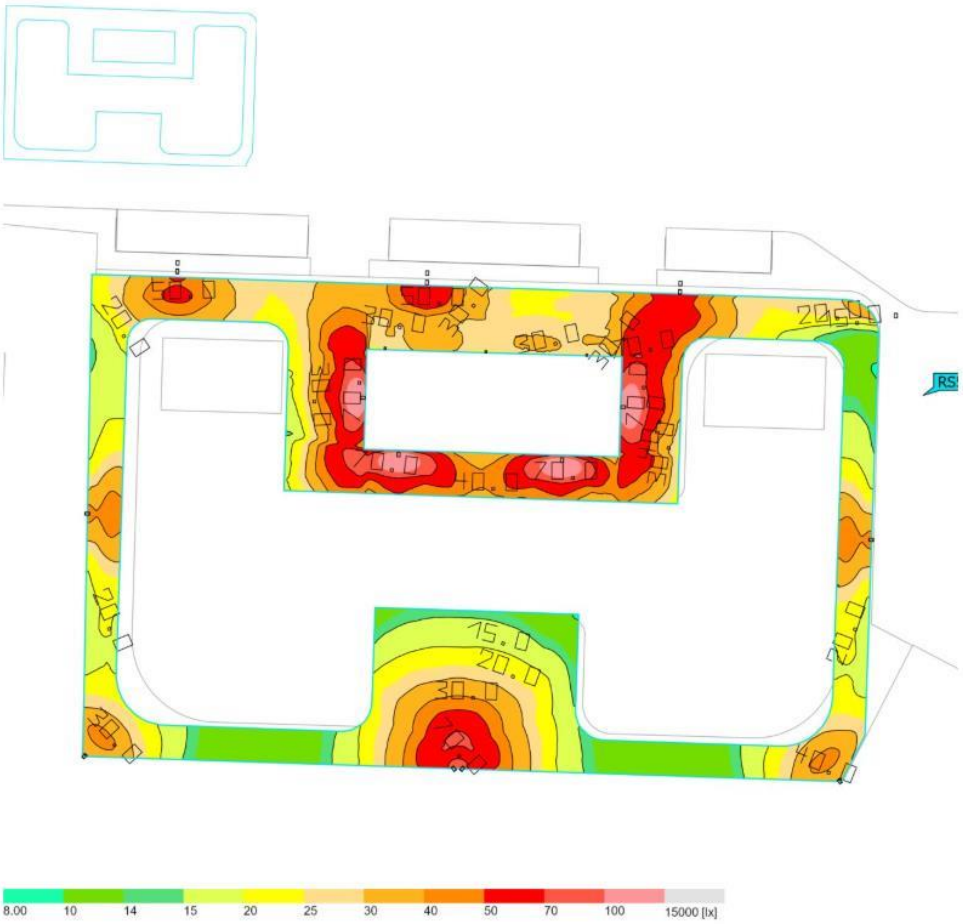


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Ramp Perpendicular illuminance (adaptive) Height: 0.000 m	42.9 lx	11.9 lx	82.7 lx	0.28	0.14	RS4

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

HV Substation

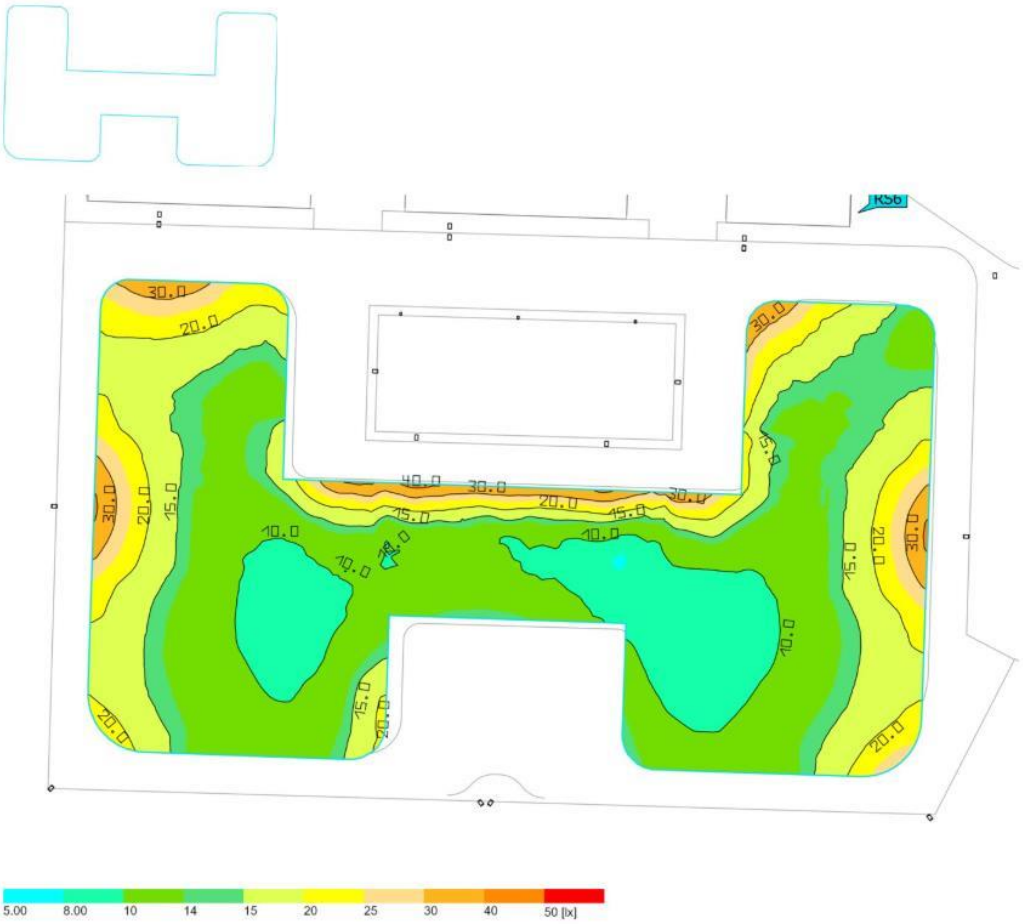


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
HV Substation Perpendicular illuminance (adaptive) Height: 0.000 m	34.0 lx	9.83 lx	164 lx	0.29	0.060	RS5

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

HV Substation

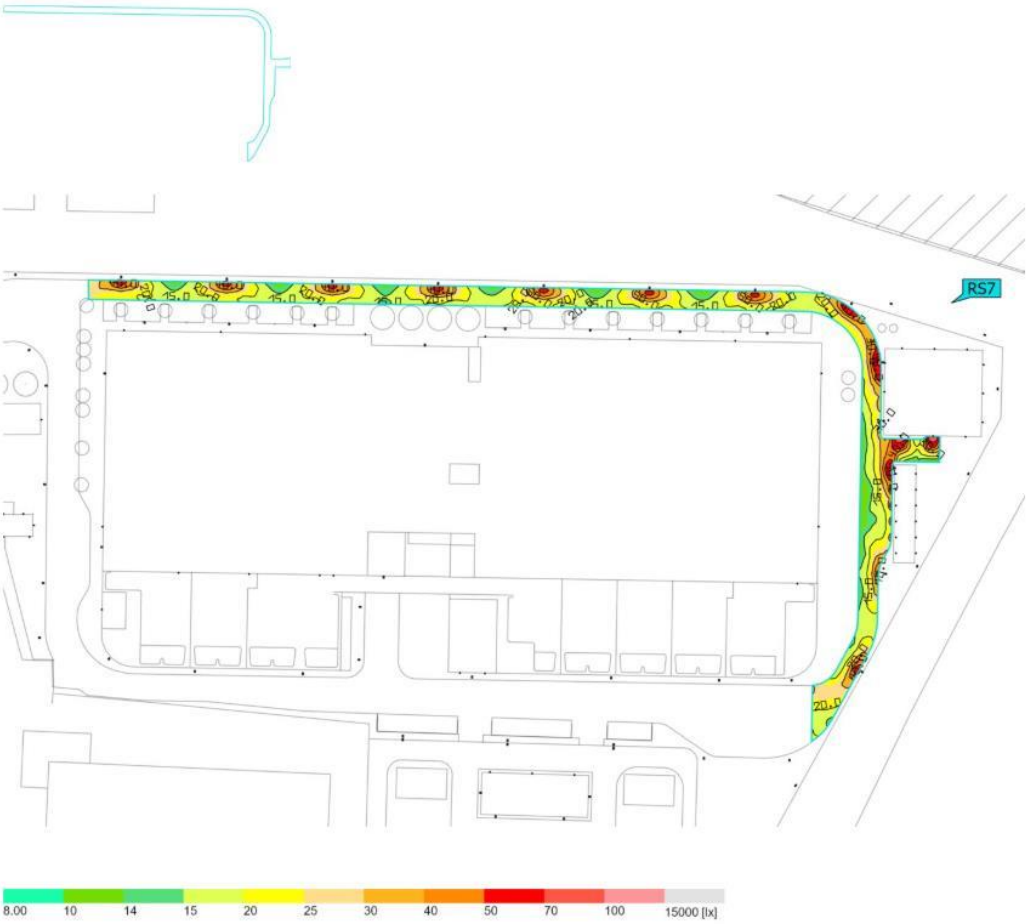


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
HV Substation Perpendicular illuminance (adaptive) Height: 0.000 m	15.2 lx	7.79 lx	44.1 lx	0.51	0.18	RS6

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Road 2

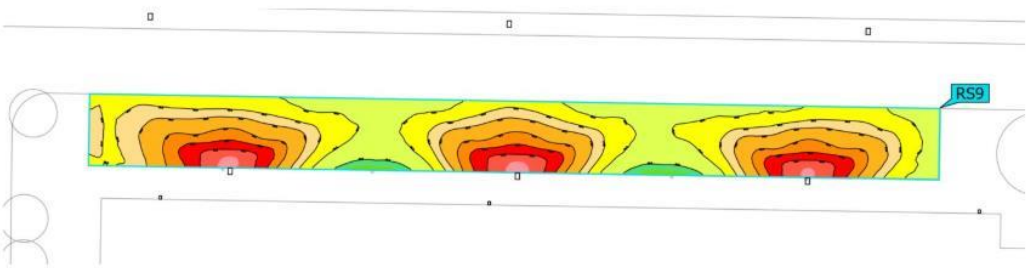


Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Road 2 Perpendicular illuminance (adaptive) Height: 0.000 m	24.6 lx	9.97 lx	104 lx	0.41	0.096	RS7

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Parking 2

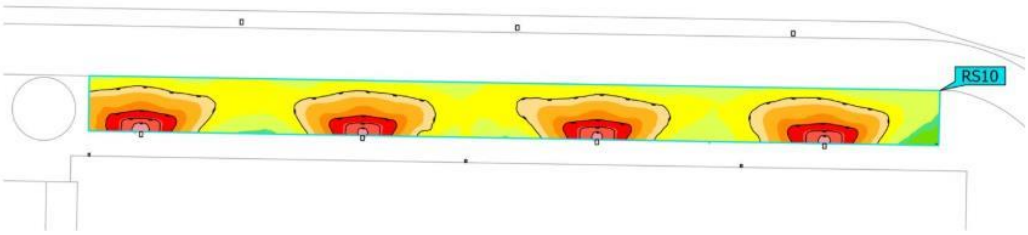


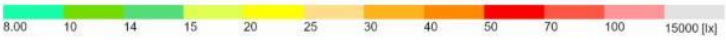
Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Parking 2 Perpendicular illuminance (adaptive) Height: 0.000 m	30.8 lx	12.8 lx	109 lx	0.42	0.12	RS9

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Parking 3





Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Parking 3 Perpendicular illuminance (adaptive) Height: 0.000 m	30.5 lx	9.88 lx	110 lx	0.32	0.090	RS10

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

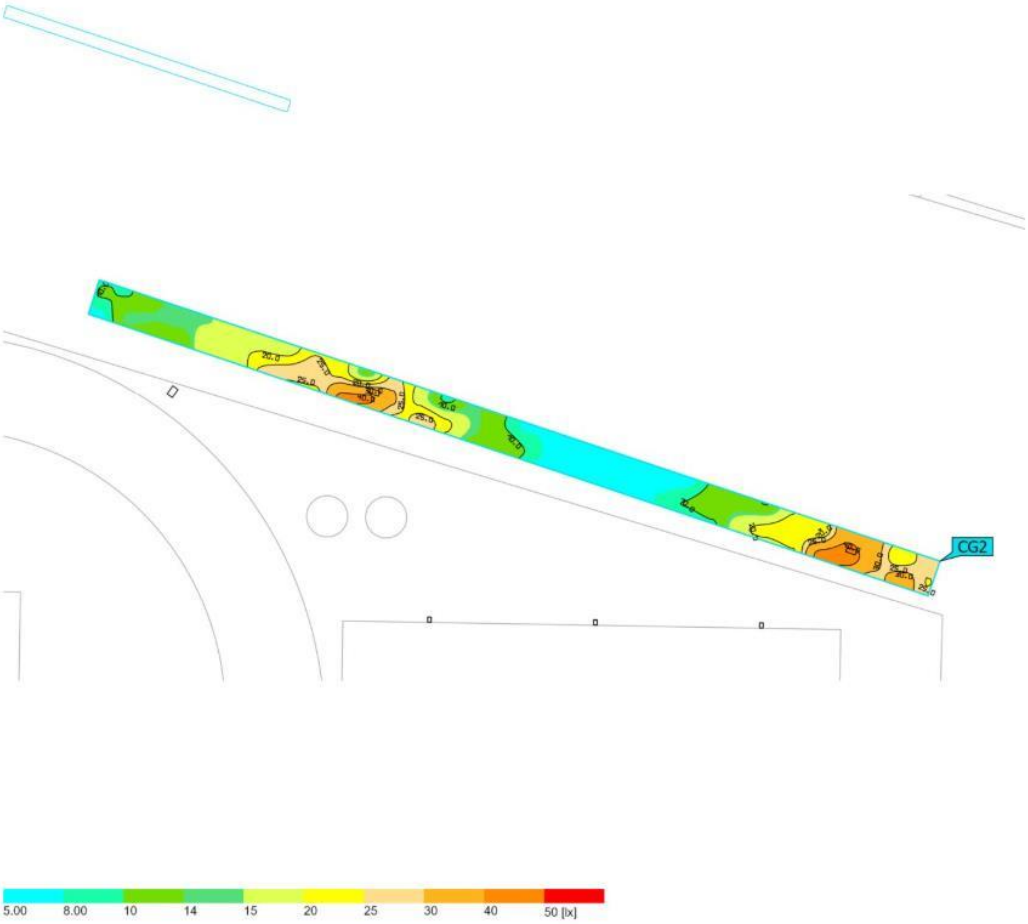
Security Perimeter

Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Security Perimeter Perpendicular illuminance Height: 0.000 m	16.9 lx	4.89 lx	37.2 lx	0.29	0.13	CG1

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Security Perimeter

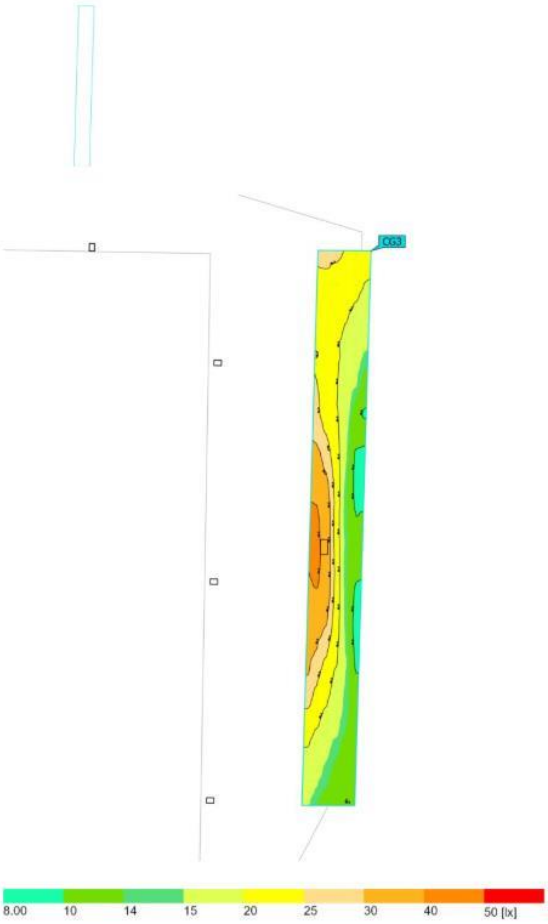


Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Security Perimeter Perpendicular illuminance Height: 0.000 m	18.1 lx	5.21 lx	44.8 lx	0.29	0.12	CG2

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Security Perimeter

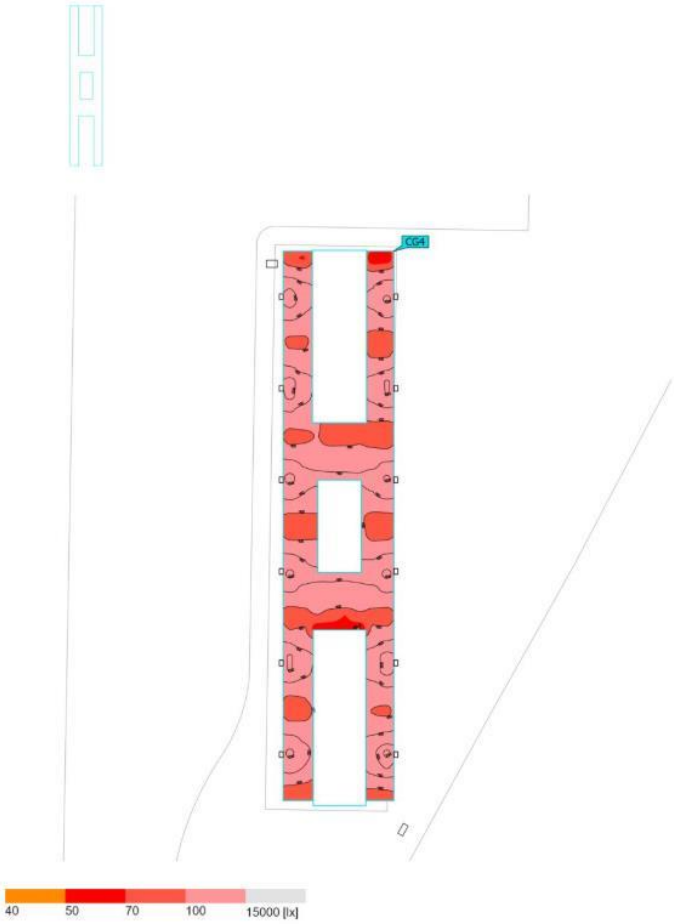


Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Security Perimeter Perpendicular illuminance Height: 0.000 m	20.5 lx	9.02 lx	42.6 lx	0.44	0.21	CG3

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

WTB Gen Area

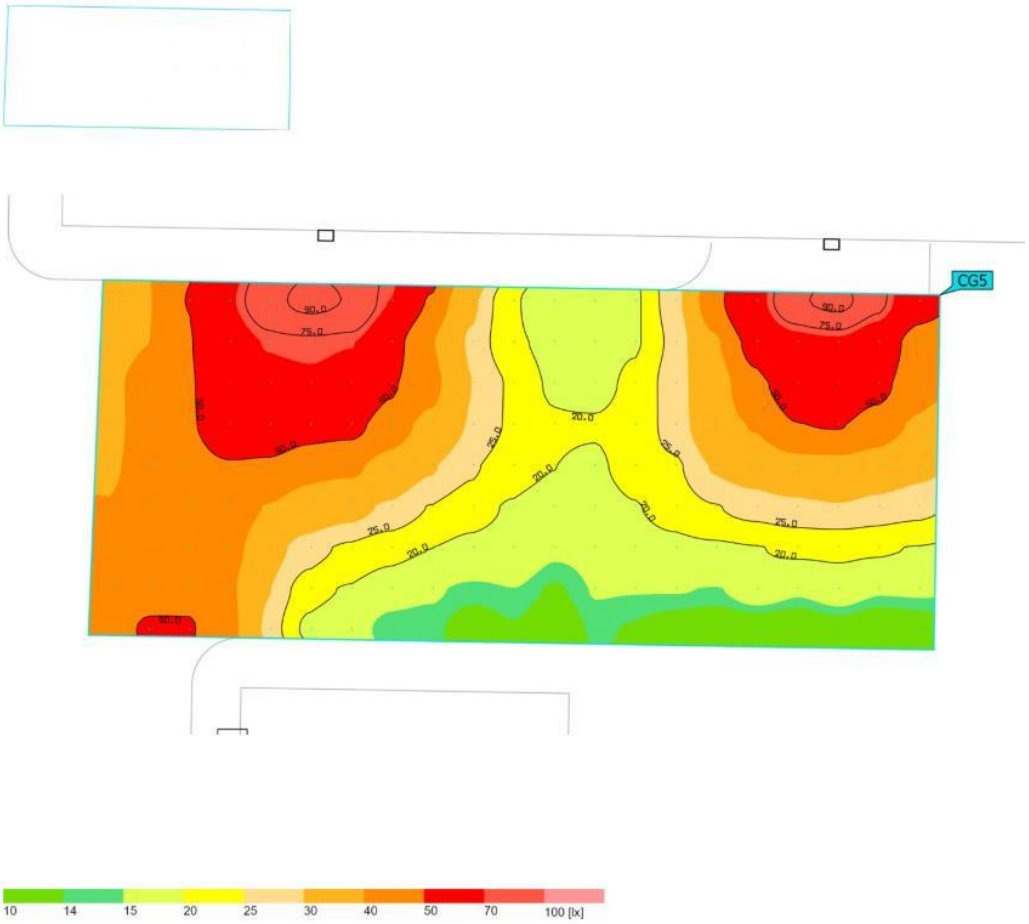


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
WTB Gen Area Perpendicular illuminance Height: 0.000 m	131 lx	48.4 lx	229 lx	0.37	0.21	CG4

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

WTB access road

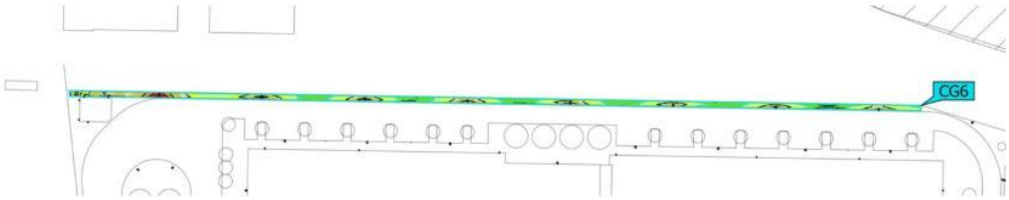


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
WTB access road Perpendicular illuminance Height: 0.000 m	34.9 lx	10.9 lx	94.9 lx	0.31	0.11	CG5

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Security Perimeter



Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Security Perimeter Perpendicular illuminance Height: 0.000 m	22.4 lx	9.30 lx	62.2 lx	0.42	0.15	CG6

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Security Perimeter

Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Security Perimeter Perpendicular illuminance Height: 0.000 m	26.8 lx	9.84 lx	46.2 lx	0.37	0.21	CG7

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

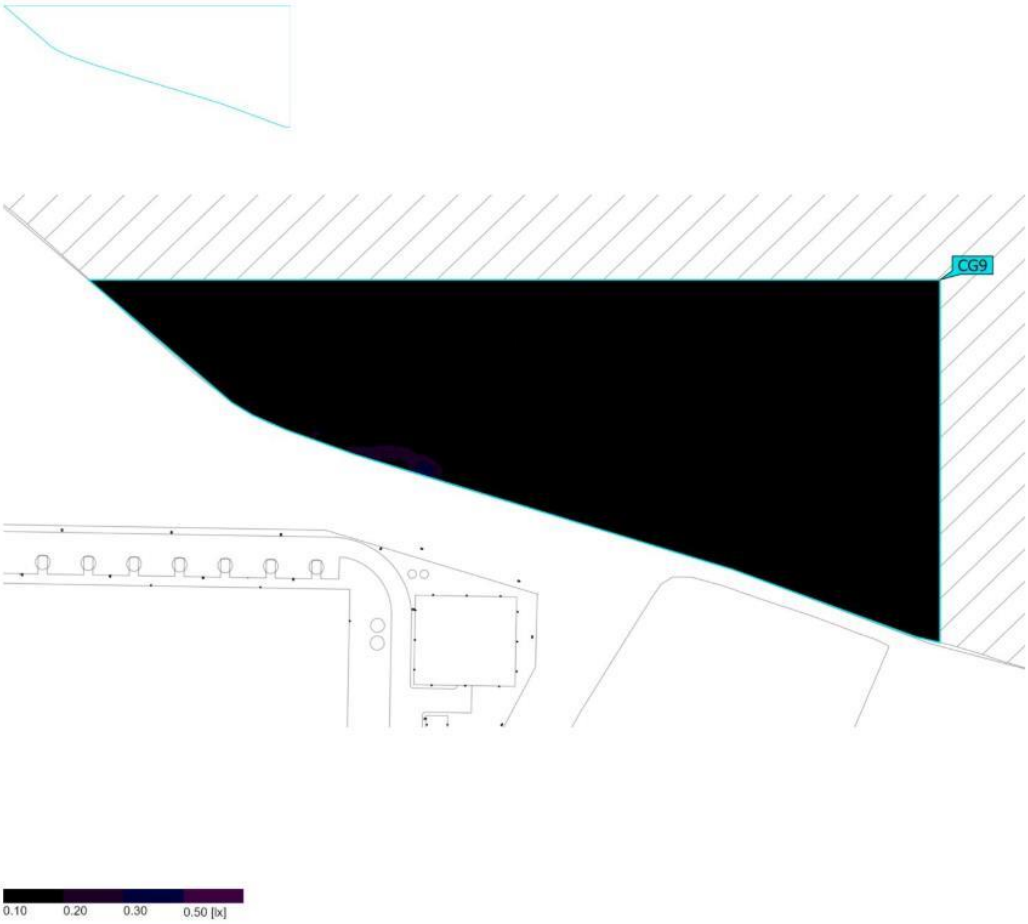
Carpark 1

Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Carpark 1 Perpendicular illuminance Height: 0.000 m	35.3 lx	20.1 lx	60.1 lx	0.57	0.33	CG8

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Park Area A

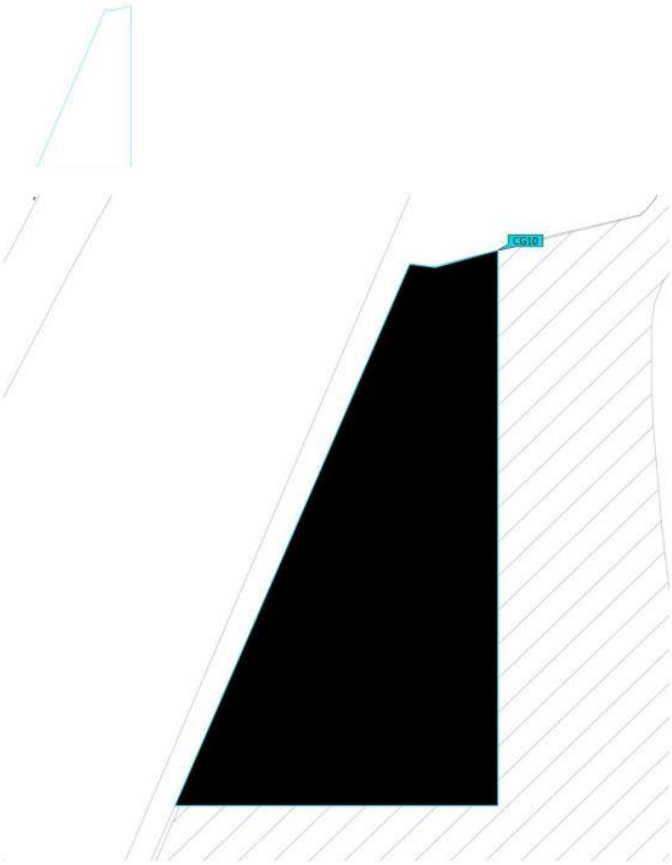


Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Park Area A Perpendicular illuminance Height: 0.000 m	0.021 lx	0.001 lx	0.40 lx	0.048	0.003	CG9

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Park Area B



0.10 [lx]

Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Park Area B Perpendicular illuminance Height: 0.000 m	0.011 lx	0.003 lx	0.024 lx	0.27	0.13	CG10

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Allegato C – Relazione di calcolo illuminazione area accesso al data centre

Il presente allegato riporta i risultati dei calcoli illuminotecnici del progetto, sviluppati mediante software dedicato, al fine di verificare i livelli di illuminamento e la conformità ai requisiti normativi.

DIALux

Note: Nota: l'illuminazione esterna del sito è stata inclusa per valutarne il contributo e sviluppare uno schema progettuale complessivo (integrato).

Luminaire list

Φ_{total}	P_{total}	Luminous efficacy
89359 lm	739.2 W	120.9 lm/W

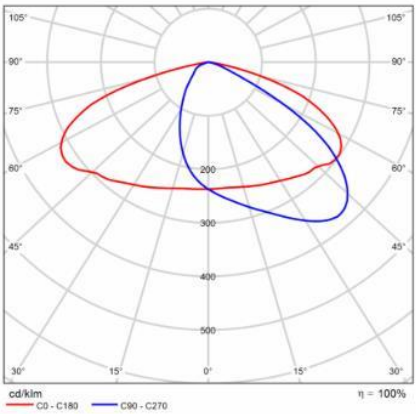
pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
2	Thorlux Lighting	RL19071	REALTA WIDE LED POLY COVER	11.0 W	1320 lm	120.0 lm/W
7	Thorlux Lighting	SB062R5	STARBEAM LED ROADWAY	71.0 W	9640 lm	135.8 lm/W
6	WE-EF	134-1625	DOC110 [B] IP66:LED-6/12W/3K;DOC110 LED, Ceiling Luminaires	14.5 W	1347 lm	92.9 lm/W
2	ewo		ewo_FA100-WD_AS08-sat-8led	9.9 W	948 lm	95.7 lm/W
7	ewo		ewo_FA170_AS06-sat-16led	16.2 W	1323 lm	81.7 lm/W

DIALux

Product data sheet

ewo - ewo_FA100-WD_AS08-sat-8led

P	9.9 W
Φ_{Lamp}	948 lm
$\Phi_{Luminaire}$	948 lm
η	99.99 %
Luminous efficacy	95.7 lm/W
CCT	3000 K
CRI	80



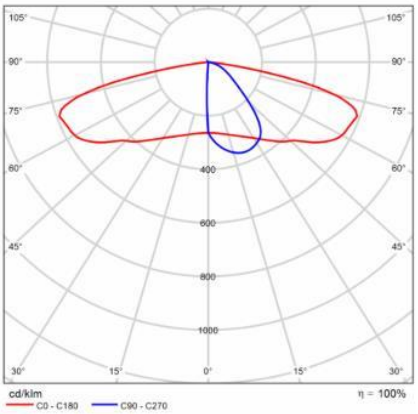
Polar LDC

DIALux

Product data sheet

ewo - ewo_FA170_AS06-sat-16led

P	16.2 W
Φ_{Lamp}	1323 lm
$\Phi_{Luminaire}$	1323 lm
η	99.99 %
Luminous efficacy	81.7 lm/W
CCT	3000 K
CRI	80



Polar LDC

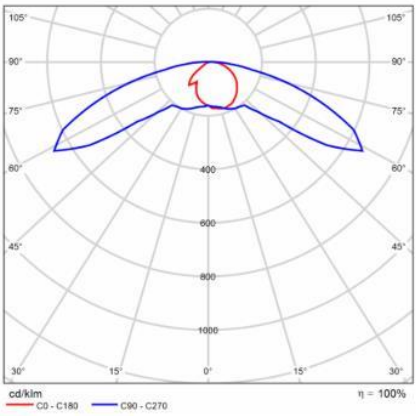
DIALux

Product data sheet

Thorlux Lighting - REALTA WIDE LED POLY COVER

Note: Site lighting included to examine contribution and develop holistic scheme.

Article No.	RL19071
P	11.0 W
Φ_{Lamp}	1320 lm
$\Phi_{Luminaire}$	1320 lm
η	100.00 %
Luminous efficacy	120.0 lm/W
CCT	4000 K
CRI	80



Polar LDC

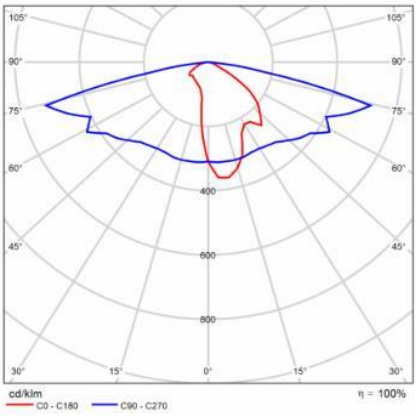
DIALux

Product data sheet

Thorlux Lighting - STARBEAM LED ROADWAY

Note: Site lighting included to examine contribution and develop holistic scheme.

Article No.	SB062R5
P	71.0 W
Φ_{Lamp}	9640 lm
$\Phi_{Luminaire}$	9640 lm
η	100.00 %
Luminous efficacy	135.8 lm/W
CCT	4000 K
CRI	70



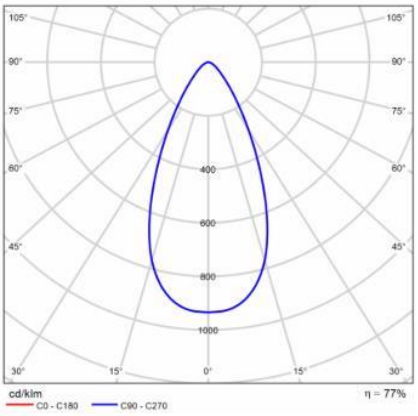
Polar LDC

DIALux

Product data sheet

WE-EF - DOC110 [B] IP66:LED-6/12W/3K;DOC110 LED, Ceiling Luminaires

Article No.	134-1625
P	14.5 W
Φ_{Lamp}	1740 lm
$\Phi_{Luminaire}$	1347 lm
η	77.40 %
Luminous efficacy	92.9 lm/W
CCT	3000 K
CRI	80



Polar LDC

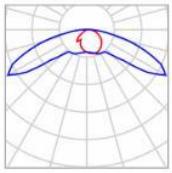
Site 1

Luminaire layout plan

DIALux

Site 1

Luminaire layout plan



Manufacturer	Thorlux Lighting	P	11.0 W
Article No.	RL19071	$\Phi_{Luminaire}$	1320 lm
Article name	REALTA WIDE LED POLY COVER		
Fitting	1x 8W LED		

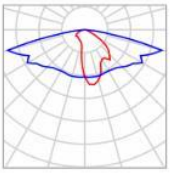
Individual luminaires

X	Y	Mounting height	Luminaire
229.151 m	116.820 m	2.800 m	18
239.300 m	116.820 m	2.800 m	19

DIALux

Site 1

Luminaire layout plan



Manufacturer	Thorlux Lighting	P	71.0 W
Article No.	SB062R5	$\Phi_{Luminaire}$	9640 lm
Article name	STARBEAM LED ROADWAY		
Fitting	1x 62W LED		

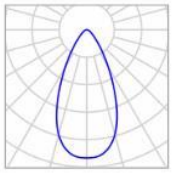
Individual luminaires

X	Y	Mounting height	Luminaire
202.994 m	138.100 m	8.000 m	13
202.994 m	123.100 m	8.000 m	17
234.295 m	116.793 m	8.000 m	20
194.900 m	116.500 m	8.000 m	21
215.800 m	99.300 m	8.000 m	22
245.819 m	99.269 m	8.000 m	23
275.724 m	99.093 m	8.000 m	24

DIALux

Site 1

Luminaire layout plan



Manufacturer	WE-EF	P	14.5 W
Article No.	134-1625	$\Phi_{Luminaire}$	1347 lm
Article name	DOC110 [B] IP66:LED-6/12W/3K;DOC110 LED, Ceiling Luminaires		
Fitting	6x LED-6/12W/830 - 3000K		

6 x WE-EF DOC110 [B] IP66:LED-6/12W/3K;DOC110 LED, Ceiling Luminaires

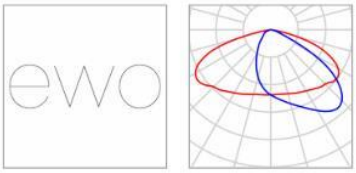
Type	Line arrangement
1st luminaire (X/Y/Z)	218.508 m / 155.144 m / 4.085 m
X-direction	6 pcs., Centre - centre, 1.992 m
Arrangement	A1

X	Y	Mounting height	Luminaire
216.516 m	155.144 m	4.085 m	1
218.508 m	155.144 m	4.085 m	2
220.499 m	155.144 m	4.085 m	3
222.491 m	155.144 m	4.085 m	4
224.483 m	155.144 m	4.085 m	5
226.474 m	155.144 m	4.085 m	6

DIALux

Site 1

Luminaire layout plan



Manufacturer	ewo	P	9.9 W
Article name	ewo_FA100-WD_AS08-sat-8led	$\Phi_{Luminaire}$	948 lm
Fitting	1x 80CRI-3000K-350mA-		

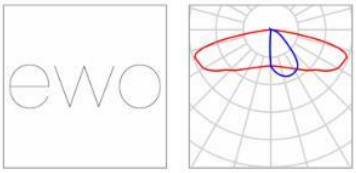
Individual luminaires

X	Y	Mounting height	Luminaire
234.195 m	154.950 m	3.000 m	10
214.668 m	147.362 m	3.000 m	12

DIALux

Site 1

Luminaire layout plan



Manufacturer	ewo	P	16.2 W
Article name	ewo_FA170_AS06-sat-16led	$\Phi_{Luminaire}$	1323 lm
Fitting	1x 80CRI-3000K-300mA-		

3 x ewo ewo_FA170_AS06-sat-16led

Type	Line arrangement
1st luminaire (X/Y/Z)	224.142 m / 138.550 m / 3.500 m
X-direction	3 pcs., Centre - centre, 9.325 m
Arrangement	A2

X	Y	Mounting height	Luminaire
224.142 m	138.550 m	3.500 m	7
224.142 m	129.225 m	3.500 m	8
224.142 m	119.900 m	3.500 m	9

Individual luminaires

X	Y	Mounting height	Luminaire
224.100 m	148.976 m	3.500 m	11
222.310 m	134.690 m	3.500 m	14
215.150 m	134.500 m	3.500 m	15
222.310 m	124.000 m	3.500 m	16

Site 1 (Light scene 1)

Calculation objects

DIALux

Site 1 (Light scene 1)

Calculation objects

Calculation surfaces

Properties	$\bar{E}$	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Building entrance under canopy 30lx 0.4 Perpendicular illuminance Height: 0.000 m	35.6 lx	22.1 lx	46.0 lx	0.62	0.48	CG1
Building approach - flat 20lx, 0.25 Perpendicular illuminance Height: 0.000 m	20.4 lx	8.12 lx	35.3 lx	0.40	0.23	CG2
Accessible Route 20lx 0.4 Perpendicular illuminance Height: 0.000 m	20.1 lx	12.3 lx	28.9 lx	0.61	0.43	CG3
Pebble benches Perpendicular illuminance Height: 0.000 m	5.70 lx	2.48 lx	22.6 lx	0.44	0.11	CG4
Building approach - stairs 30lxmin, 0.4 Perpendicular illuminance Height: 0.010 m	31.7 lx	30.5 lx	32.9 lx	0.96	0.93	CG5
Building approach - stairs 30lxmin, 0.4 Perpendicular illuminance Height: -0.782 m	30.9 lx	29.6 lx	32.2 lx	0.96	0.92	CG6
Footpath 5lx 0.25 Perpendicular illuminance Height: 0.000 m	7.80 lx	1.96 lx	39.0 lx	0.25	0.050	CG7

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

DIALux

Site 1 (Light scene 1)

Building entrance under canopy 30lx 0.4

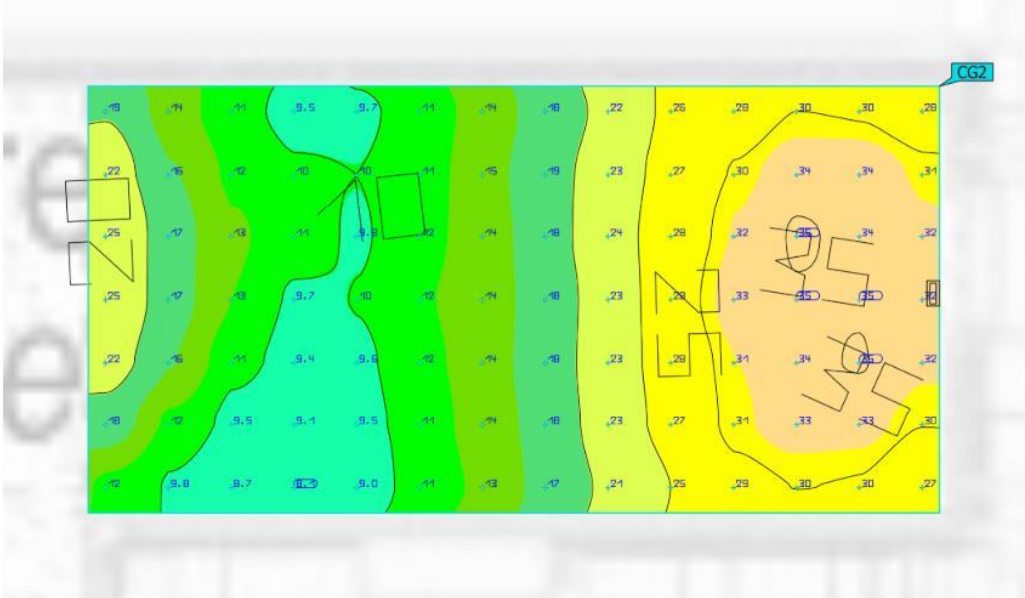
Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Building entrance under canopy 30lx 0.4 Perpendicular illuminance Height: 0.000 m	35.6 lx	22.1 lx	46.0 lx	0.62	0.48	CG1

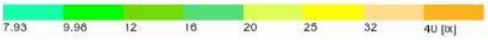
Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

DIALux

Site 1 (Light scene 1)

Building approach - flat 20lx, 0.25



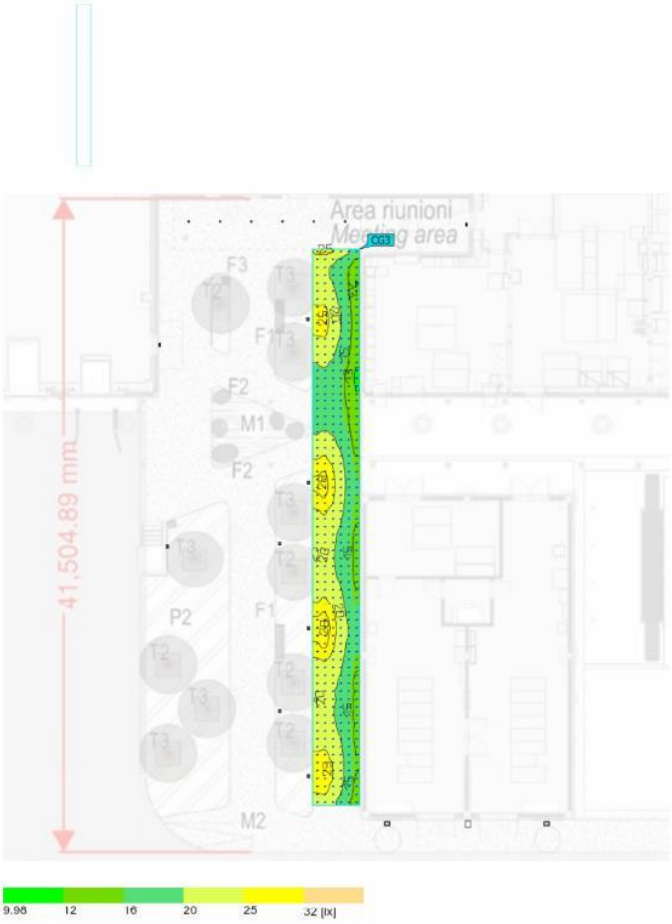


Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Building approach - flat 20lx, 0.25 Perpendicular illuminance Height: 0.000 m	20.4 lx	8.12 lx	35.3 lx	0.40	0.23	CG2

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

Site 1 (Light scene 1)

Accessible Route 20lx 0.4



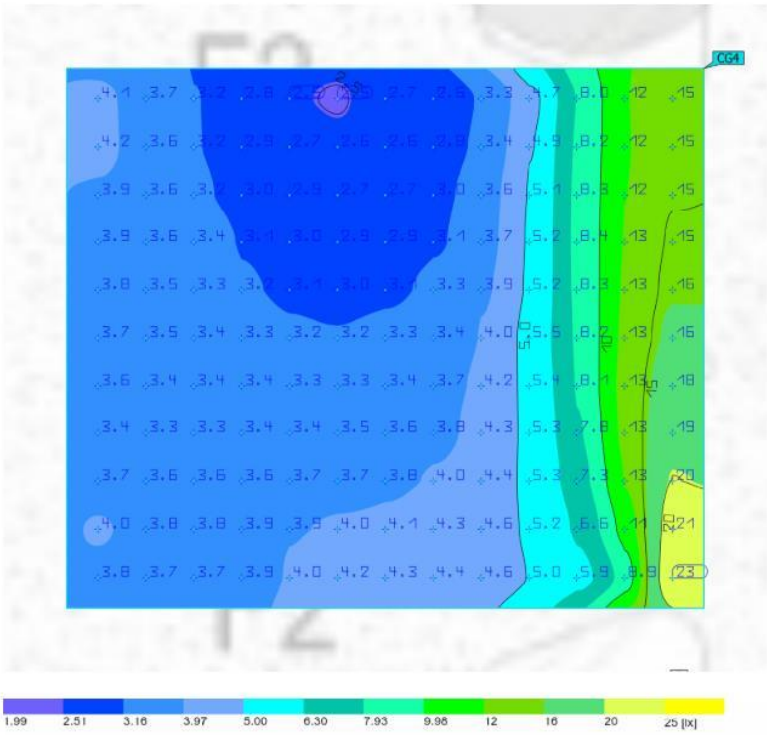
Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Accessible Route 20lx 0.4 Perpendicular illuminance Height: 0.000 m	20.1 lx	12.3 lx	28.9 lx	0.61	0.43	CG3

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

DIALux

Site 1 (Light scene 1)

Pebble benches



Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Pebble benches Perpendicular illuminance Height: 0.000 m	5.70 lx	2.48 lx	22.6 lx	0.44	0.11	CG4

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

DIALux

Site 1 (Light scene 1)

Footpath 5lx 0.25

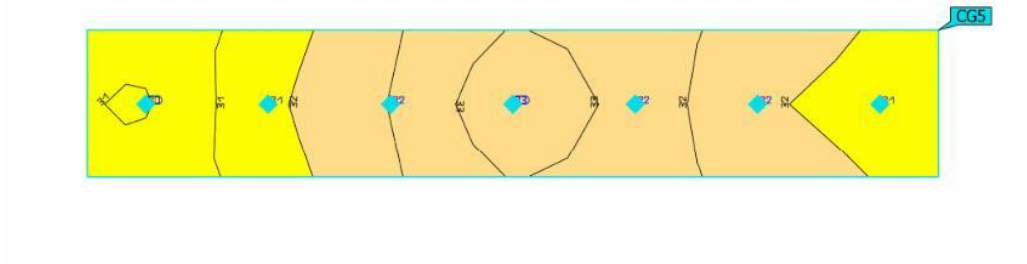
Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Footpath 5lx 0.25 Perpendicular illuminance Height: 0.000 m	7.80 lx	1.96 lx	39.0 lx	0.25	0.050	CG7

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

DIALux

Site 1 (Light scene 1)

Building approach - stairs 30lxmin, 0.4



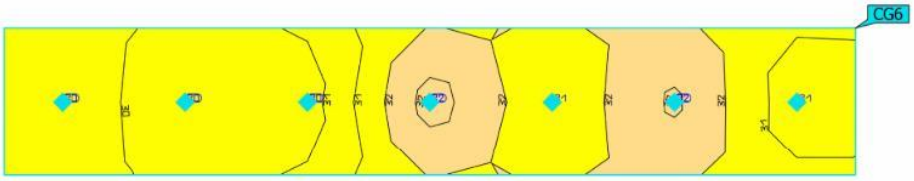
Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Building approach - stairs 30lxmin, 0.4 Perpendicular illuminance Height: 0.010 m	31.7 lx	30.5 lx	32.9 lx	0.96	0.93	CG5

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))

DIALux

Site 1 (Light scene 1)

Building approach - stairs 30lxmin, 0.4



Properties	Ē	E_{min}	E_{max}	U_o (g_1)	g_2	Index
Building approach - stairs 30lxmin, 0.4 Perpendicular illuminance Height: -0.782 m	30.9 lx	29.6 lx	32.2 lx	0.96	0.92	CG6

Utilisation profile: DIALux presetting (5.1.4 Standard (outdoor transportation area))